GOV DOC
BRA 795
part 1 of 2

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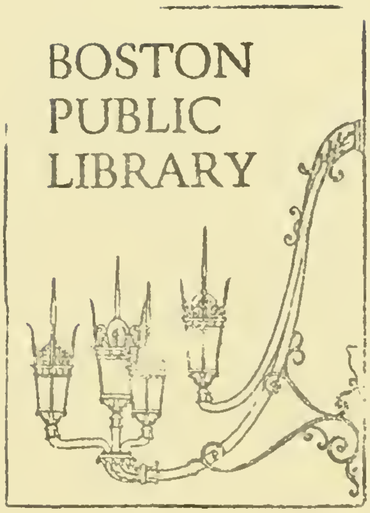


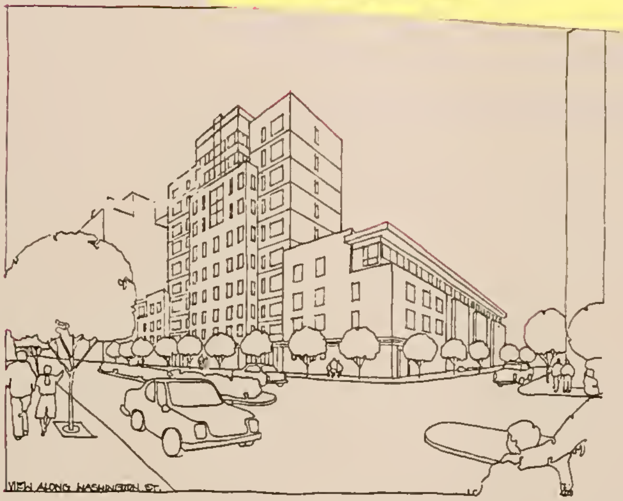
BRA
795
Part 1 of 2

OAK TERRACE
888 Washington St., Boston

DEVELOPER: Oak Terrace Limited Partnership
Asian Community Development Corporation

FINANCED BY: Massachusetts Housing Finance Agency
MHFA 91-007-N

BOSTON PUBLIC LIBRARY


VIEW ALONG WASHINGTON ST.

華信屋

[illegible]T CONSULTANT:
The Community Builders
95 Berkeley Street
Boston, MA 02118
(617) 693-9595

ARCHITECT:
Lawrence K. Cheng Associates, Inc.
107 South Street Suite 403
Boston, MA
(617) 728-3113

CONSULTING ARCHITECT/LANDSCAPE ARCHITECT:
Williams Associates, Inc.
497 Massachusetts Avenue
Cambridge, MA 02139
(617) 547-6757

STRUCTURAL ENGINEER:
Lim Consultants, Inc.
872 Massachusetts Avenue
Cambridge, MA 02139
(617) 354-0780

MECHANICAL/PLUMBING/FIRE PROTECTION ENGINEER:
Environmental Design Engineers, Inc.
200 5th Avenue
Waltham, MA 02154
(617) 466-8040

ELECTRICAL ENGINEER:
Vincent A. DiIorio, Inc.
101 Access Road
Norwood, MA 02062
(617) 255-9754

GEOTECHNICAL ENGINEER:
GeoEnvironmental, Inc.
320 Needham Street
Newton Upper Falls, MA 02164
(617) 969-0050

25 September 1992

ADDENDUM NUMBER ONE

This Addendum adds to, deletes from, clarifies, or alters the original Contract Document package prepared by Lawrence K. Cheng Associates, Inc. dated 4 September 1992, as follows:

I. BID DOCUMENTS:

A. Notwithstanding the bidding and contract requirements issued on September 4, 1992, please be advised of the following:

1. The Contractor agrees that, in the event it fails to achieve Substantial Completion and Certificate of Occupancy by the date required herein and because the Owner's damages will be difficult to ascertain, then, in such event, Contractor shall pay to the Owner and Owner may deduct from any payments due Contractor as liquidated damages, and not as a penalty, $1,800 per day until Substantial Completion and Certificate of Occupancy is achieved. Please also see Alternate #4, which references this requirement.

2. The Owner will purchase Builder's Risk Insurance in compliance with Section 11.3 of the Supplementary Conditions. References to Builder's Risk insurance in MHFA Exhibit A are superceded.

3. The amount of Overhead and Profit, General Conditions, and Bond Premium allowed for any change orders shall be limited to: (a) ten percent (10%) for the Subcontractor; (b) ten percent (10%) for the Contractor, for a total of twenty percent (20%), multiplied by the net increase in costs as a result of any change. Changes shall be presented in the following form:

Cost of Labor
Cost of Materials
    Subtotal:

5% Sales Tax on Materials
35% Labor burden on Labor
    Subtotal:

General Requirements
    Subtotal:

Overhead
Subtotal:

Bond Premium
Total Cost of Change Order:

B. Bid Proposal Form:

The Bid Form has been revised and reissued. A copy is enclosed as part of this Addendum. Total 12 sheets.

C. Bid Bond:

The Bid Bond shall be in the amount of five (5) percent of the total base bid included on page two of the Bid Proposal Form.

D. Standard Form of Agreement:

1. Paragraph 7.1: Relocate language "See Rider 5A" to Article 6.
2. Riders to Standard Form of Agreement: Rider 4B is incorrectly identified as Rider 4C. Change 4C to 4B.

E. Supplemental General Conditions:

1. Paragraph 3.7.1: Insert the phrase "including the building permit," after "and all other permits".

F. MHFA "Addendum No. 1":

Retitle this Document "MHFA Exhibit C" to avoid confusion with Addendum No. 1 issued by the Architect.

II. TECHNICAL SPECIFICATIONS:

Where Specification Sections have been revised and reissued, additions or alterations to the text are indicated by an asterisk in brackets at the left margin "[*]" and the affected text has also been bracketed "[ ]".

A. Section 01010, "Summary of Work":

Revise 1.2 E. 2. a. to read as follows: "Below ground foundation walls, slabs, and structures of the existing building will be removed in their entirety and excavation shall be filled with clean bankrun sand or gravel fill."

B. Section 01025, "Unit Prices":

This Section is revised and reissued; the Schedule of Unit Prices has been revised to include additional information and additional units. A copy is enclosed as part of this Addendum. Total 3 sheets.

C. **Section 01030, "Alternates":**

This Section is revised and reissued; the Schedule of Alternates has been revised to include additional Alternates requested by the Owner. A copy is enclosed as part of this Addendum. Total 3 sheets.

D. **Section 01500, "Temporary Facilities":**

Clarification: Weather Protection, including heat, enclosures, coverings, and other temporary protection of the work adversely affected by moisture, cold, and wind, is included in the work of this Section and all costs therefor are to be included in the Base Bid.

E. **Section 01900, "Existing Conditions":**

Add the enclosed letter from GZA/GeoEnvironmental to ACDC dated 2 August 1991 and Laboratory Tests results to soil information included in Section 01900. Total 11 sheets.

F. **Section 02220, "Handling and Disposing of Contaminated Materials":**

1. Add the following to 1.02 "Scope of Work":

   "b. The work does not include the screening, testing and analysis of soils described in this Section required to determine if hazardous materials are present; this work will be performed by a qualified independent testing laboratory employed by the Owner at no cost to the Contractor. The Contractor shall provide assistance in the performance of this analysis, and shall perform the work required to manage excavated materials as indicated.

   "c. Approximately 800 cubic yards of material are estimated to require handling and management as work of this Section. It is expected that most or all of this material will be classified as "Unregulated Soil". "

2. Revise 1.06 A. 4. and other locations as follows: All Unregulated Soil materials shall be reused on site, at locations approved by the Architect. Excess Unregulated Soil materials, if any, shall be disposed of as part of the Base Bid, at no cost to the Owner.
3. Revise 3.01 B. 4. and Part 4 to delete unit pricing for soil testing and for disposal of Unregulated Soil. Excavation, handling, placing, and disposing (if any) of Unregulated Soil Materials is included in the Base Bid as Earthwork. Testing of soil to

determine material classification will be performed by the Owner.

G. **Section 02350, "Pile Foundations":**

This Section is revised and reissued to incorporate work previously included in Section 02356 and 02357 as pile testing, and to clarify the scope of work to be performed as part of the base bid. A copy is enclosed as part of this Addendum. Total 16 sheets.

H. **Sections 02356 and 02357 are** DELETED ENTIRELY.

I. **Section 02700, "Sanitary and Storm Sewerage Systems":**

1. Clarification: Hubless pipe will **not** be accepted.
2. Revise references to catch basin and manhole frames, covers, and grates from ductile iron to cast iron, in compliance with BWSC requirements.

J. **Section 05400, "Cold Formed Metal Framing":**

Revise 1.3 B. "Structural Performance" to read as follows: "Provide steel stud framing assemblies with no failure or permanent deflection exceeding 1/600 of any member's span after removal of imposed load, or any deflection exceeding 1/360 of any member's span **at EIFS panel assemblies or 1/600 of any member's span at brick veneer assemblies** under imposed load for the following pressures....

K. **Section 08390, "Storm and Screen Doors":**

Delete the word "courtyard" from 1.1 B. to make this sentence consistent with Door Schedule, which indicates screen/storm doors at street and courtyard rowhouse doors.

L. **Section 08500, "Aluminum Windows":**

Insert the following paragraph to 1.5 "Quality Assurance" article: "A. Certification: Provide aluminum window units manufactured by an AAMA certified manufacturer."

M. **Section 08800, "Glass and Glazing":**

1. Clarification: The glazing specifications indicated apply to both factory-glazed windows specified in Section 08500 and hollow metal frames specified in Section 08100.
2. Revise 2.5 A. 3. - 5. to 3/4 inch thick insulating glass units with 1/8 inch thick panes of glass instead of 1 inch thick units with 1/4 inch thick panes.
3. Revise 2.5 B. to standard Low-E glass, with "hard"

coating installed on third surface. Revise performance values for Low-E glazing units accordingly.

N. **Section 10522, "Fire Extinguishers, Cabinets, and Accessories":**

Delete all references to fire extinguisher cabinets from section; no cabinets are included in the work. Wall mounted fire extinguishers are required at Building Electrical Room and Main Mechanical Room.

O. **Section 10550, "Postal Specialties":**

Delete 2.3 E.; no mail directory is included in the work.

P. **Section 10800, "Toilet Accessories":**

This Section is revised and reissued; medicine cabinets have been revised, mirrors are added at all bathrooms, and a schedule of accessories has been added. **The Schedule of Accessories takes precedence over the information shown on drawings.** A copy is enclosed as part of this Addendum. Total 6 sheets.

Q. **Section 11450, "Residential Kitchen Appliances":**

Revise cooking appliances to electric from gas; provide electric ranges, cooktops, and wall oven units with similar features to gas units specified.

R. **Section 14210, "Traction Elevators":**

This Section is revised and reissued to include additional information on firefighter's operation and equipment, clarification of scope and responsibility of this Section, and other changes to specified systems. A copy is enclosed as part of this Addendum. Total 11 sheets.

S. **Section 15400, "Plumbing":**

1. Revise 2.15, P-3 and P-3A to read as follows:

P-3 Bath - Aquarius Model 2508 or 2509 right or left hand, 5 foot acrylic bath tub/shower, non-skid bottom, bottom outlet. Provide Sterling tip-toe drain and overflow fitting. Moen #8339 spout, shower head and valve, 1-1/2" trap to suit.

P-3A Tower Bath - Aquarius "Mass Special" Model 2766 or 2767 right or left hand, 6 foot acrylic bath tub/shower with seat. Provide drain, trap, overflow fitting same as P-3.

Moen #8339 non-scald valve, diverter with volume control tub spout, Moen flow hand spray units with spray head, 24 inch chrome bar with adjustable slide, and in-line vacuum breaker, wall connections and flange and integral stops. Mount all valves at sidewall.

2. Revise 2.16 C. to read as follows: "Motors - Pump No. 1 shall be driven by a 7-1/2 HP, 208 V, 3 phase, 60 hertz, 3500 RPM, drip-proof motor. Pump No. 2 shall be driven by a HP, volt, phase, hertz, RPM drip-proof motor. Each pump motor shall meet NEMA standards and operate within the nameplate horsepower at any point on the pump capacity head curve. Motors shall have class "F" insulation with 1.25 service factor and be of the high efficiency type."

3. Add the following Article:

2.17 REDUCED PRESSURE BACKFLOW PREVENTER

A. Provide reduced, pressure device consisting of two independent, center guided, "Y" pattern spring loaded, check valves; a differential pressure relief valve mounted between the two checks, and three test cocks. An inlet shutoff valve with a fourth test cock and an outlet shutoff valve are added to make a complete and serviceable assembly. In normal operation, the check valves with the pressure between the checks, called the zone, being maintained at least 5 psi lower than the inlet pressure and the relief valve shall remain closed. Should abnormal conditions arise under backflow, the differential relief valve shall open and discharge to maintain the zone at least 2 psi lower than the inlet pressure; thus preventing the contamination of the supply.

B. The reduced pressure backflow assembly shall be approved by the Commonwealth of Massachusetts.

C. Provide air gap drain.

D. Provide OS&Y valves.

E. Povide repair kit and test kit.

T. Section 16000, "Electrical":

1. Add the following paragraph to 2.17:

"D. All devices in exterior and party walls shall be provided with insulating gaskets."

2. At Section 2.32 A. 3., delete paragraphs k. through n. and replace with the following:

"k. Provide the control of all air supply, exhaust and pressurization fans and associated dampers as outlined in specification section 15600, 2.19 Automatic Controls."

III. DRAWINGS:

Where drawings are revised and reissued, changes are bubbled.

A. Site/Civil Drawings:

1. A new drawing, designated C0, is added. Drawing shows existing topographic elevations and should be reviewed in conjunction with C1. A copy is attached.

2. C2:

   a. The electric transformer vault shall be built in accordance with Boston Edison Drawing No. 32451-F with a top slab in accordance with Drawing No. 32452-F. These drawings are incorporated by reference in the Contract Documents. The General Contractor shall be responsible for the performance of this work, including mechanical and electrical work therein. The Contractor shall be approved by Boston Edison.
   b. Telephone connections shall be made to the telephone manhole at the northeast corner of the Washington Street - Oak Street intersection. The General Contractor shall provide trench, backfill, and street repair for 4 inch conduit installed by Electrical Subcontractor.

3. C3: Site utility details shown are based on City of Worcester standards. Modify frames, covers, grates and other details to Boston Water and Sewer Commission standards. Catch basin hood shall be a standard L202 hood instead of indicated Green trap.
4. L1: Add 20 foot wide gate to site enclosure fence; additional person gates at Contractor option.
5. L2: Drawing has been revised and reissued. A copy is attached.
6. L3: Drawing has been revised and reissued. A copy is attached.

B. Architectural Drawings:

1. A1.1 and A1.3: Kitchen plan of Unit B is incorrect at some locations on A1.1 and is incorrect at all locations on A1.3. Correct kitchen layout is an L shape as shown on quarter scale plans and kitchen elevations.
2. A2.1: Smoke exhaust and supply air ducts adjacent to Stair No. 1 shall be enclosed in separate 2 hour shafts, and 2 hour enclosures shall be continuous above ceiling where ducts offset horizontally to locations above.
3. Typical for A2.2 - A2.12: Partitions where load centers are located should be Partition Type 2A (3-5/8" studs). Refer to electrical drawings for load center locations.
4. Typical for A2.2 - A2.5: 2 hour shaft adjacent to smoke vestibule at Stair No. 1 should be divided into three separate 2 hour shafts (to individually enclose each of three ducts located there - see mechanical). Extend all three shafts to roof.
5. A2.2: Unlabelled closet door at Unit HP-4 should be Type T.
6. A2.3: Closet doors adjacent to kitchen at Units HP-2 should be Type T instead of Type O as indicated.

7. A2.13:

   a. Change Laundry Room door designation from T15 to T24.
   b. Delete note at Laundry Room wall "Exposed Concrete". All concrete walls at Laundry Room and Basement corridor should be covered with 1/2 inch GWB finish on metal furring.
   c. At Penthouse, door to Elevator Machine Room has been relocated to provide a three foot landing at top of ship ladder stair. 2 hour shaft adjacent to Stair No. 1 has been divided into three enclosures (see note above). **An 8-1/2 by 11 sketch of these changes designated Addendum Sketch #1 is attached.**
   d. Fixture shown on detail 4 should be Type M.

8. Typical for A5.4, A5.5, A6.2, and A8.1, and A8.2: Exterior steel stud framing shown at section and plan details is schematic only; comply with design and preformance requirements indicated in Section 05400. All openings in wall framing require built-up lintels and doubled or tripled jamb studs, whether or not shown on details.

9. A5.4 and A5.5:

   a. Tower first floor is framed with W Sections and composite deck (see Structural), not joists as indicated. Provide metal framing suspension sytem as required for GWB ceiling in lieu of direct attachment to joists.

b. Provide R-19 batt insulation above ceiling at all mechanical, electrical and storage spaces at Tower Basement.

c. Install 1/2 inch GWB finish on metal furring at Laundry Room foundation wall (see Finish Schedule).

10. A6.2: At Detail 16, emergency power conduit should be enclosed in a 2 hour shaft (as indicated on 1/4 scale floor plans), and maker furred chase for domestic water pipes as small as possible.
11. A8.2: The Door Schedule has been revised to add missing information and corrections. **An 8-1/2 by 11 sketch of the revised Door Schedule designated Addendum Sketch #2 is attached.**
12. Typical for A9.2 - A9.5: Refer to reissued Specification Section 10800 "Toilet Accessories" (included in this Addendum) for changes to toilet accessories. **Section 10800 takes precedence over drawings.** Delete soap dishes and toothbrush holders; relocate medicine cabinets and make smaller; add frameless mirrors over vanities.

C. **Structural Drawings:**

1. S-4: At beam opening details, Column Tags should be revised to a centerline of opening tags. The Contractor shall include in its Base Bid a quantity of 25 openings of Type I, 50 openings of Type II, and 50 openings of Type III.
2. S-6 - S-12 and S-15 - S-19 are revised and reissued. A copy of each is attached. Total 12 sheets.

D. **Plumbing and Fire Protection Drawings:**

1. Typical for P-2 - P-7: Not all plumbing fixtures are designated on the plans. Furnish fixtures at all locations indicated as specified in the fixture schedules.
2. Typical for P-2 - P-5: Revise all 4" standpipes at lowrise stairs to 2-1/2".
3. P-9: Revise equipment designated CP-2 to read as follows: "CP-2 Bronze - 33 GPM @30 ft. TDH with 2" flange - Taco Model 133B, 3/4 HP, 1725 RPM, 208 V, 3 Phase, 60 Cycle."

E. **Electrical Drawings:**

1. E4: Omit all 12 laundry exhaust fans and 4 of the toilet exhaust fans. Relocate 8 remaining toilet exhaust fans in accordance with drawing H-7.
2. E5:

a. Add 2-20A/1P circuits feeding the low pressure supervisory panel and the excess pressure pump located in the Fire Pump Room. Circuits to originate from Panel "EPB".
b. Omit 2 horsepower motor and associated wiring indicated in the basement mechanical room.
c. Revise Penthouse Mechanical Room 1/8 HP laundry pump to 1/3 HP.
d. Revise Penthouse Mechanical Room 1-1/2 HP recirc. pump to 3/4 HP.
e. Add 6 tamper switches in Fire Pump Room.
f. Omit 5 HP booster pump indicated at the Fire Pump Room and replace with two 7-1/2 HP pumps. Each pump to be fed with 3/4" c., 3 #10 and 1 #10 grd. from a 50A/3P in Panel "HDP".
g. Omit 2 HP domestic water pumps and associated wiring indicated in the Mechanical Penthouse.
h. Add Type M light fixture at exterior of Mechanical Penthouse; see Detail 4 on A2.13 for exact location.

3. E7 through E15:

a. Revise all three and four bedroom apartment load centers to 100A M.L.O.
b. Provide all apartment load centers with a minimum of 1 - 15A/1P spare circuit breaker.

4. E13: Revise galley Kitchen plan at Unit B1 to L shape; see E11 for correct layout.

5. E17:

a. Add a 20A/1P circuit from panel "EPB" feeding all motorized dampers.
b. Add 6 tamper switches in the Fire Pump Room.

6. E18:

a. Add a 1600 amp main breaker to the house side of the main switchboard.
b. Revise panel "HP4A" feeder to 50A/3P, 1-1/4" c., 4 #6 & 1 #10 grd. via a 60A/3P contactor.

7. E19: Revise panelboard schedule in accordance with the circuit revisions described in this Addendum.

END OF ADDENDUM NUMBER ONE.

September 4, 1992
[*] **Revised 25 September 1992**

Oak Terrace
888 Washington Street
Boston, MA 02111

BID PROPOSAL FORM

PROJECT: Oak Terrace
888 Washington Street
Boston, MA 02111

DATED: ______________________

To: Asian Community Development Corporation
360B Tremont Street
Boston, MA 02116

Gentlepeople:

The undersigned

____

(A corporation of, organized and existing under the laws of the State of: ____).

____

(A partnership consisting of: _____________________________________

____

____).

(An individual trading as: ____).

of the City of ____

in the State of ____).
agrees that if this bid is accepted as hereinafter provided he/she will, except to the extent otherwise specifically provided in the Contract Documents, provide all labor, materials, supplies, tools, plant and equipment necessary to perform all work described in Section 01010 of the Technical Specifications in strict accordance with the terms and provisions of this Contract for the construction of the aforementioned project in accordance with these documents for the following **BREAKDOWN OF COSTS:**

Bidders Initials:_____

BID ITEM 1 - GENERAL CONDITIONS as described in the attachment to this Proposal Form.

____

______________________________ Dollars($______________)

BID ITEM 2 - CONSTRUCTION COST

2A - GENERAL CONSTRUCTION WORK, including all allowance items, in accordance with breakdown of Divisions #3 through #14, inclusive as described in the attachment to this Proposal Form.

____

______________________________ Dollars($______________)

2B - MECHANICAL AND ELECTRICAL WORK in accordance with breakdown of Divisions #15 and #16 as described in the attachment to this Proposal Form.

____

______________________________ Dollars($______________)

2C - SITE DEVELOPMENT/LAND in accordance with breakdown of Division #2 as described in the attachment to this Proposal Form.

____

______________________________ Dollars($______________)

BID ITEM 3 - CONSTRUCTION MANAGER/GENERAL CONTRACTOR FEE

3A - BUILDERS OVERHEAD - ______________________________

______________________________ Dollars($______________)

3B - BUILDERS PROFIT - ______________________________

______________________________ Dollars($______________)

BID ITEM 4 - PERFORMANCE AND PAYMENT BOND PREMIUMS

____

______________________________ Dollars($______________)

TOTAL OF BID ITEMS #1 + 2A + 2B + 2C + 3A + 3B + 4

____

______________________________ Dollars($______________)

Bidders Initials: _____

NOTE - The breakdown requested above is for bid analysis and accounting purposes only. It is intended to award the project as a whole, and not in parts.

Further, as part of this proposal, the undersigned agrees to execute such alternate proposals (Additive or Deductive) as may be set forth in the Schedule of Alternate Proposals as attached to this Proposal Form.

Further, as part of the proposal, the undersigned provides the unit prices indicated on the attached schedule for designated work. These unit prices shall be for additions to or deletions from the work to be performed under the basic Contract during the entire life of said Contract but shall be considered as payment forms ONLY and not for the purposes of determining contract award.

Further, as part of the proposal, the undersigned agrees that the overhead and profit for extra work if ordered on a Time and Material basis in accordance with Article 12 of the Conditions will on the same percentage basis as listed in Bid Item #3.

It is understood that the Owner reserves the right to accept or reject any and all bids that the Owner deems to be in his best interest; he further reserves the right to negotiate with any bidder or to award a contract to other than the low bidder or a non-bidder and otherwise to proceed with the Project as best suits the intent of the work.

Acknowledgement is hereby made of the following addenda supplements to the Drawings and Specification:

Addendum No.____________________Dated__________________

Addendum No.____________________Dated__________________

Addendum No.____________________Dated__________________

Upon notification of acceptance of this proposal, the undersigned agrees to execute a contract in the form as stated within these contract documents for the amount stated.

Prices quoted shall be guaranteed for

____

days after date of proposal.

Bidders Initials:_____

[*] **The Undersigned will furnish, within three (3) days the following Attachments:**

- **#1 General Conditions Breakdown;**
- **#2 General Construction Work Breakdown;**
- **#3 Mechanical and Electrical Work Breakdown;**
- **#6 Proposed Manning Table;**
- **#7 Staffing and Principal Subcontractors;**

and agrees to execute the work in accordance with said Manning Table using nominated Contractors and personnel to deviate there from only with the express approval of the Owner.

By submission of this Proposal, the Undersigned acknowledges that they have visited the site, informed themselves of the existing conditions, and have included in the Proposal a sum to cover the costs of all items in the contracts.

[*] **Acknowledgement is made that the following Attachments are submitted with this Bid Proposal:**

Attachment No. 4 - Schedule of Alternate _____
Attachment No. 5 - Schedule of Unit Prices _____

Respectfully submitted,

Contractor

By:________________________________ Title:____________________

Business Name: ____

Address:____

Telephone Number: ____

Attest:____________________________ Title____________________

SEAL IF REQUIRED

Bidders Initials:____

ATTACHMENT NUMBER 1

GENERAL CONDITIONS
(Bid Item #1)

Supervision:	Project Manager	$ ________
	Project Superintendent	$ ________
	Assistant Superintendent	$ ________
	Project Engineer	$ ________
	M & E Coordinator	$ ________
	Job Accountant	$ ________
Clerical:	Clerk/Secretary	$ ________
	Timekeeper	$ ________
Engineering		$ ________
Messenger and Deliveries		$ ________
Field Office		$ ________
Field Office Equipment & Supplies		$ ________
Prints, Supplies, Etc.		$ ________
Janitorial & Maintenance		$ ________
Dumpsters		$ ________
Telephone		$ ________
Utilities		$ ________
Permits & Fees		$ ________
Travel		$ ________
Watchman		$ ________
Job Meetings		$ ________
Payroll Service		$ ________
Storage		$ ________
Fences, Walks & Bridges		$ ________
Signs		$ ________
Medical & Hospital		$ ________
Safety Provisions		$ ________
Temporary Services -	Light & Power	$ ________
	Heat	$ ________
	Water	$ ________
	Toilets	$ ________
	Protection, General	$ ________
[*]	**Weather Protection**	$ ________
	Stairs & Rails	$ ________
	Doors	$ ________
	Windows	$ ________
	Dust	$ ________
	Noise	$ ________
	Dewatering	$ ________
Trucking		$ ________
Fuel:	Gas & Oil	$ ________
Cleaning:	General	$ ________
	Final	$ ________
Glass Cleaning & Breakage		$ ________
Miscellaneous Damage Repair		$ ________
Small Tools		$ ________
Hoisting		$ ________
SUBTOTAL GENERAL CONDITIONS		$ ________

Bidders Initials:_____

ATTACHMENT NUMBER 1

GENERAL CONDITIONS
(Bid Item #1) (Cont'd)

SUBTOTAL GENERAL CONDITIONS (forward)	$ ________________
Rigging	$ ________________
Schedule	$ ________________
Expediting	$ ________________
Drinking Water	$ ________________
Fire Protection	$ ________________
Rentals	$ ________________
Street Repairs	$ ________________
Miscellaneous: Petty Cash	$ ________________
Job Insurance	$ ________________
Equal Employment	$ ________________
Record Drawings	$ ________________
Warranty/Guaranty Assembly Costs	$ ________________
TOTAL VALUE OF GENERAL CONDITIONS	$ ________________

Bidders Initials:_____

ATTACHMENT NUMBER 2

GENERAL CONSTRUCTION WORK BREAKDOWN
(Bid Item #2A)

03300 - Cast-in-Place Concrete $ ____________
04200 - Unit Masonry $ ____________
05120 - Structural Steel $ ____________
05220 - Steel Joists $ ____________
05310 - Steel Decking $ ____________
05400 - Cold Formed Metal Framing $ ____________
05500 - Metals Fabrications $ ____________
06100/400 - Carpentry $ ____________
06600 - Plastic Wall Panels $ ____________
07160 - Bituminous Dampproofing $ ____________
07175 - Water Repellents $ ____________
07210 - Building Insulation $ ____________
07241 - Exterior Insulation & Finish Systems Class PB $ ____________
07250 - Sprayed-On Fireproofing $ ____________
07270 - Firestopping $ ____________
07530 - Single Ply Membrane Roofing $ ____________
07600 - Flashing & Sheet Metal $ ____________
07610 - Sheet Metal Roofing $ ____________
07700/10 - Roof Specialties & Fascias $ ____________
07900 - Joint Sealants $ ____________
08100 - Standard Steel Doors & Frames $ ____________
08200 - Wood Doors $ ____________
08305 - Access Doors $ ____________
08350 - Metal Bi-Fold Doors $ ____________
08390 - Combination Storm & Steel Doors $ ____________
08520 - Aluminum Windows $ ____________
08710 - Door Hardware $ ____________
08800 - Glass & Glazing $ ____________
09250 - Gypsum Drywall $ ____________
09262 - Gypsum Sheathing $ ____________
09270 - Gypsum Board Shaft Wall Systems $ ____________
09300 - Tile $ ____________
09511 - Acoustical Panel Ceilings $ ____________
09650 - Resilient Flooring & Accessories $ ____________
09680 - Carpet $ ____________
09900 - Painting $ ____________
10200 - Louvers & Vents $ ____________
10425 - Signs $ ____________
10522 - Fire Extinguishers & Accessories $ ____________
10550 - Postal Specialties $ ____________
10800 - Toilet & Bath Accessories $ ____________
10916 - Closet Specialties $ ____________
11170 - Solid Waste Handling Equipment $ ____________
11450 - Residential Equipment Appliances $ ____________
12372 - Kitchen & Bath Cabinets $ ____________
12500 - Window Treatments $ ____________
14210 - Electric Traction Elevators $ ____________
14560 - Chutes $ ____________

TOTAL VALUE OF GENERAL CONSTRUCTION WORK (2A) $ ____________

Bidders Initials:_____

ATTACHMENT NUMBER 3

MECHANICAL AND ELECTRICAL WORK BREAKDOWN
(Bid Item #2B)

	15400 - Plumbing	$ ____________
	15500 - Fire Protection	$ ____________
	15600 - Heating, Ventilating & Air Conditioning	$ ____________
	16000 - Electrical Work	$ ____________
	TOTAL VALUE OF MECHANICAL & ELECTRICAL WORK (Bid Item 2B)	$ ____________

SITE DEVELOPMENT/LAND BREAKDOWN
(Bid Item #2C)

	02110 - Site Preparation	$ ____________
	02160 - Excavation Support Systems	$ ____________
	02200 - Earthwork	$ ____________
[*]	**02220 - Handling Contaminated Soil**	**Unit Price Only**
[*]	**02350 - Foundation Piles & Testing**	$ ____________
	02511/15/20 - Paving & Surfacing	$ ____________
	02600 - Water & Fire Service Piping	$ ____________
	02700 - Sanitary & Storm Sewerage Systems	$ ____________
	02830 - Chain Link Fencing & Gates	$ ____________
	02900 - Landscape Work	$ ____________
	TOTAL VALUE OF SITE DEVELOPMENT/ LAND BREAKDOWN (Bid Item #2C)	$ ____________

Bidders Initials:_____

ATTACHMENT NUMBER 4

SCHEDULE OF ALTERNATE PROPOSALS

In accordance with the terms and conditions of the Contract and the Proposal Form, the undersigned agrees to execute alternates selected for the sums set forth in the following schedule of Alternate Proposals in accordance with the general description outlined in Section 01030.

Alternate Number 1 - State the amount to be DELETED from the Base Bid for the substitution of sheet vinyl flooring and vinyl base at all unit bathrooms in lieu of ceramic tiles as specified in Section 01030 and as shown on the drawings.

DELETED____

______________________________________Dollars($_______________)

Alternate Number 2 - State the amount to be DELETED from the Base Bid for the substitution of roller shades for horizontal blinds at all windows as specified in Section 01030.

DELETED____

______________________________________Dollars($_______________)

[*] **Alternate Number 3 - State the amount to be DELETED from the Base Bid for the substitution of KF Brick "SUFFIELD" for Morin "OLD PORT NARROW RANGE" brick as specified in Section 04200.**

DELETED____

______________________________________Dollars($_______________)

[*] **Alternate Number 4 - State the amount to be ADDED to the Base Bid for the inclusion the contract of a provision specifying liquidated damages of $500,000 for the first day beyond the date required and $1,800 per day thereafter until Substantial Completion and Certificate of Occupancy is achieved.**

DELETED____

______________________________________Dollars($_______________)

Bidders Initials:_____

ATTACHMENT NUMBER 5

SCHEDULE OF UNIT PRICES

In accordance with the terms and conditions of the Contract and as part of the base proposal, the undersigned agrees to the following unit prices for designated work as described in Section 01025 which shall be considered as payment forms and not for purpose of determining contract award.

It shall be noted that work deducted from the basic contract covered by these stated unit prices will be DEDUCTED at the stated value LESS 15 percent.

[*] **Unit #1A - Excavation, handling, and disposal of material classified as Hazardous Waste out-of-state incorporating all ancillary costs as specified in Section 02220 . . . . $________/ton**

[*] **Unit #1B - Excavation, handling, and disposal of material classified as hazardous material at a DEP Class A recycling center, incorporating all ancillary costs as specified in Section 02220 . . . . $________/ton**

[*] **Unit #1C - Excavation, handling, and disposal classified as Regulated Soil at a DEP approved Sanitary Land Fill Site located within the Commonwealth of Massachusetts, incorporating all ancillary costs as specified in Section 02220 . . . . $________/ton**

Unit #2 - Purchase, deliver, place, and compact acceptable borrowed fill as specified in Section 02200 to replace removed contaminated soil . . . . $________/cu.yd.

Unit #3 - Furnish and install reinforced precast piles as specified in Section 02350 . . . . $________/ln.ft.
[*] **(16,000 linear feet included in Base Bid.)**

Unit #4 - Preaugering as required for reinforced precast piles as specified in Section 02350 . . . . $________/ln.ft.

Bidders Initials:_____

ATTACHMENT NUMBER 6

PROPOSED MANNING TABLE

Bidders Initials:_____

ATTACHMENT NUMBER 7

STAFFING AND PRINCIPAL SUBCONTRACTORS

Project Manager: ____________________

Project Superintendent(s): ____________________

____

(Attach biographies for each nominated employee)

Principal Subcontractors:

Excavator: ____________________

Concrete Contractor: ____________________

Masonry: ____________________

Carpentry & Drywall: ____________________

Structural Steel, Joists & Decking: ____________________

Miscellaneous Metals: ____________________

Windows: ____________________

Hardware: ____________________

Resilient Flooring & Carpet: ____________________

Painting: ____________________

Kitchen Cabinets: ____________________

Waste Disposal Equipment: ____________________

Elevators: ____________________

Plumbing: ____________________

HVAC: ____________________

Fire Protection Systems: ____________________

Electrical Work: ____________________

Bidders Initials: _____

SECTION 01025 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for unit prices.

1. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.
2. The unit price represents the cost in place of the unit of measure and includes all necessary material, general conditions costs, overhead, profit and applicable taxes.
3. The stated unit price represents the cost to the Owner for the addition of the indicated unit of quantity to the Work. Where quantities are deleted from the Work, the deletion will occur at 85 percent of the scheduled values.

B. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.

1. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 UNIT PRICE SCHEDULE

[*]A. Item No. 1 - [ ][Work Associated with Section 02220, "Handling and Disposal of Contaminated Materials". Definitions and requirements for each unit of measure are included in Section 02220. Include all ancillary costs for each item in the unit price:]

[*] [1. Item No. 1A: Excavation, handling, and disposal of material classified as Hazardous Waste out-of-state. Unit of Measure: Price per ton.]

[*] [2. Item No. 1B: Excavation, handling, and disposal of material classified as Hazardous Material at a DEP Class A recycling center. Unit of Measure: Price per ton.]

[*] [3. Item No. 1C: Excavation, handling, and disposal of material classified as Regulated Soil at a DEP approved Sanitary Land Fill Site located within the Commonwealth of Massachusetts. Unit of Measure: Price per ton.]

B. Item No. 2 - Additional Fill:

1. Description: Purchase, deliver, place, and compact acceptable borrowed fill as specified in Section 02200, "Earthwork", to replace removed contaminated soil.

[*] [2. Additional fill required to achieve indicated grade lines and levels is included in base bid. Unit price compensation for additional fill will be paid only for fill replacing materials removed under Section 02220.]

3. Unit of Measurement: Cubic yard of material placed.

C. Item No. 3 - Foundation Piles:

1. Description: Furnish and install reinforced precast piles as specified in Section 02350, "Foundation Piles."

[*] [2. Include in base bid a total cost for the work assuming an estimated 16,000 lineal footage of piles. Additional/lesser amounts will be added/deducted from the contract price at the unit costs shown here.]

3. Unit of Measurement: Linear foot of piles driven.

D. Item No. 4 - Preaugering for Foundation Piles:

1. Description: Preaugering as required for reinforced precast piles as specified in Section 02350, "Foundation Piles".
2. Unit of Measurement: Linear foot of augering required.

END OF SECTION 01025

SECTION 01030 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for Alternates.

B. Schedule: A "Schedule of Alternates", prices for which are to be included in the Contractor's Bid Form, is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each Alternate.

C. Definition: An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.

1. The dollar amount indicated in the Bid Form for each alternate shall be the total adjustment to the base bid for each alternate, including General Conditions costs, overheads, and profit.
2. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

D. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES:

A. Alternate No. 1: State the amount to be DELETED from the Base Bid to change residential bathroom floor and base finish shown as unglazed ceramic mosaic tile to sheet vinyl. Delete floor and base tile, stone threshold, and waterproofing membrane work specified in Section 09300, "Tile", and replace with sheet vinyl, vinyl base and edge strips specified in Section 09650, "Resilient Flooring".

B. Alternate No. 2: State the amount to be DELETED from the Base Bid to change window treatment indicated as horizontal blinds to roller blinds. Delete applicable parts of Section 12500, "Window Treatment", and replace with the following:

1. Products:

   a. Roller Blinds: Unit consisting of tear-proof woven fiberglass coated with fade-resistant, flame-retardant vinyl plastic shade; wood roller with heavy duty springs and positive locking mechanism; 1-1/4 inch by 5/16 inch hard wood slat sewn into shade hem with cotton cord and pull attached.
   b. Provide mounting brackets for installation at window head as recommended by manufacturer.

2. Installation: Install per manufacturer's instructions to operate properly and smoothly without catching.

[*]C. Alternate No. 3: State the amount to be DELETED from the Base Bid to change brick masonry Color A shown as Morin "Old Port Narrow Range" in Section 04200 to KF Brick, Inc. "Suffield". Size and other requirements are unchanged.

[*]D. Alternate No. 4: State the amount to be ADDED to the Base Bid to include in the Contract a provision specifying liquidated damages of $500,000 for the first day beyond the date required and $1,800 per day thereafter until Substantial Completion and Certificate of Occupancy are achieved. Other contract provisions are unchanged.

END OF SECTION 01030

GZA
GeoEnvironmental, Inc.

Engineers and Scientists

320 Needham Street
Newton Upper Falls
Massachusetts 02164
617-969-0050
FAX 617-965-7769

A Subsidiary of GZA GeoEnvironmental Technologies, Inc.

August 2, 1991
File No. 12535-C,PC

Asian Commumity Development Corporation
360-B Tremont Street
Boston, Massachusetts 02116

Attention: Ms. Carol Lee, Executive Director

Re: Geotechnical Data Report
BRA Parcel B
Boston, Massachusetts

Dear Ms. Lee:

Following the completion of subsurface explorations and geotechnical laboratory testing, GZA GeoEnvironmental, Inc. is pleased to present this geotechnical data report summarizing our findings. These data include a location plan of the proposed Parcel B development, locations of the borings, profiles of the subsurface explorations interpreted from the boring data which are more fully described on the enclosed individual boring logs, and the results of laboratory testing performed on selected undisturbed samples of the underlying clay deposits.

Not Included

In addition to the enclosed data specific to the Parcel B site, also contained are the results of the subsurface explorations and laboratory testing completed for the adjacent Parcel A site for Chinese Economic Development Corporation (CEDC).

The borings indicate the subsurface profile consists of miscellaneous fill, overlying compressible silty clay soils, overlying a thin glacial till, overlying argillite bedrock. The primary foundation engineering consideration is whether or not deep foundations should be used. This is a function of estimated total settlement due to compression of clay soils under the imposed structural loads from the proposed structures. Secondly, consideration must be given for the potential differential settlement between structures of differing foundation loads. Finally, consideration must be given to the potential costs relative to disposal of the on-site fills, which is somewhat dependant on the number of basement levels and the foundation scheme ultimately selected.

Three foundation systems are presently under consideration; a mat foundation bearing on the upper stiff clay deposit, caissons bearing within the clay, and deep end bearing piles bearing on the glacial till and/or bedrock. Each of these likely foundation schemes will be more fully discussed in a forthcoming foundation design summary report. This report will present a comparative cost analysis of the various alternates along with excavation and disposal cost estimates.

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In the meantime, should you have any questions with regard to the data contained herein, please do not hesitate to contact the undesigned.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Franklin M. Grynkewicz

Franklin M. Grynkewicz
Senior Project Manager

Walter E. Jaworski

Walter E. Jaworski
Senior Principal

FMG:idm

BRA PARCEL B - LABORATORY TEST RESULTS

Project Name ACDC-PARCEL B

LABORATORY TESTING DATA SUMMARY

Reviewed by
Date
Required

Project No. 12535 Project Engr. F. GRYNKEWICZ Assigned By F. GRYNKEWICZ Date Assigned JUNE 91

Boring or Test Pit No.	Sample No.	Depth ft.	Lab No.	IDENTIFICATION TESTS								DENSITY		STRENGTH TESTS					CONSOL.	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	$\frac{C_c}{1 + e_0}$	
GZB-4	T-1	20-21	1		Average Total Unit Weight (20.0-21.0') = 123.9 Pcf															
		20.2		26.3										Tv= 1.15 tsf						Olive Grey Silty CLAY of high plasticity, very stiff consistency
		20.2-20.4		26.1	39	19														
		20.6		26.9										Tv= 1.28 tsf						
		20.8		26.8										Tv= 1.25 tsf						
		20.8-20.9		25.9	38	19														
	T-2	30-32	2		Average Total Unit Weight (30.0-32.0') = 118.9 Pcf															
		30.4		33.1										Tv= 0.75 tsf						Olive Grey Silty CLAY of high plasticity, stiff consistency
		30.6-30.7		36.8	25	16														Note:- 1/4" Sand layer @ 30.5' depth, - 2 1/2" Sand layer from 30.8'-31.1' depth, Numerous Silt lenses from 30.5-30.8' depth
		31.1		32.2										Tv= 0.53 tsf						
		31.3 31.4		37.5							85.0								0.20	
		31.4-31.6		34.4	45	23														
		31.7		33.2										Tv= 0.60 tsf						

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

Project Name ACOC-PARCEL B

LABORATORY TESTING DATA SUMMARY

Reviewed by
Date
Required

Project No. 12535 Project Engr. F. GRYNKEWICZ Assigned By F. GRYNKEWICZ Date Assigned JUNE 91

Boring or Test Pit No.	Sample No.	Depth ft.	Lab No.	IDENTIFICATION TESTS								DENSITY		STRENGTH TESTS					CONSOL.	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	MAX (pcf) / W_{opt} (%)	Perme-ability cm/sec	Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	$\frac{C_c}{1 + e_0}$	
GZB-1	T-1	40-42	3		Average Total Unit Weight (40.0-41.9') = 120.3 Pcf															
		40.2		28.9																Olive Grey Clayey SILT, little fine Sand @ 40.4' change to- Olive Grey Silty CLAY of high plasticity, stiff consistency Note: Numerous thin Silt lenses and 2 - 1/2" Sand layers from 40.8-41.2' depth
		40.5		29.9										Tv= 0.59 tsf						
		40.5-40.7		25.3	41	21														
		41.0		30.6										Tv= 0.38 tsf						
		41.1-41.2		29.1	28	19														
		41.6		31.2										Tv= 0.51 tsf						
	T-2	50-52	4																	
		50.2		21.7										Tv= 0.14 tsf						Olive Grey fine SAND and SILT, trace Clay layers @ 50.8' change to- Olive Grey CLAY & SILT, medium plasticity, medium consistency, trace (+) fine Sand
		50.2-50.6		Save																
		50.6		23.5										Tv= 0.25 tsf						
		50.9-51.0		23.6	26	17														
		51.1		24.5										Tv= 0.33 tsf						
		51.4-51.5			31	18														

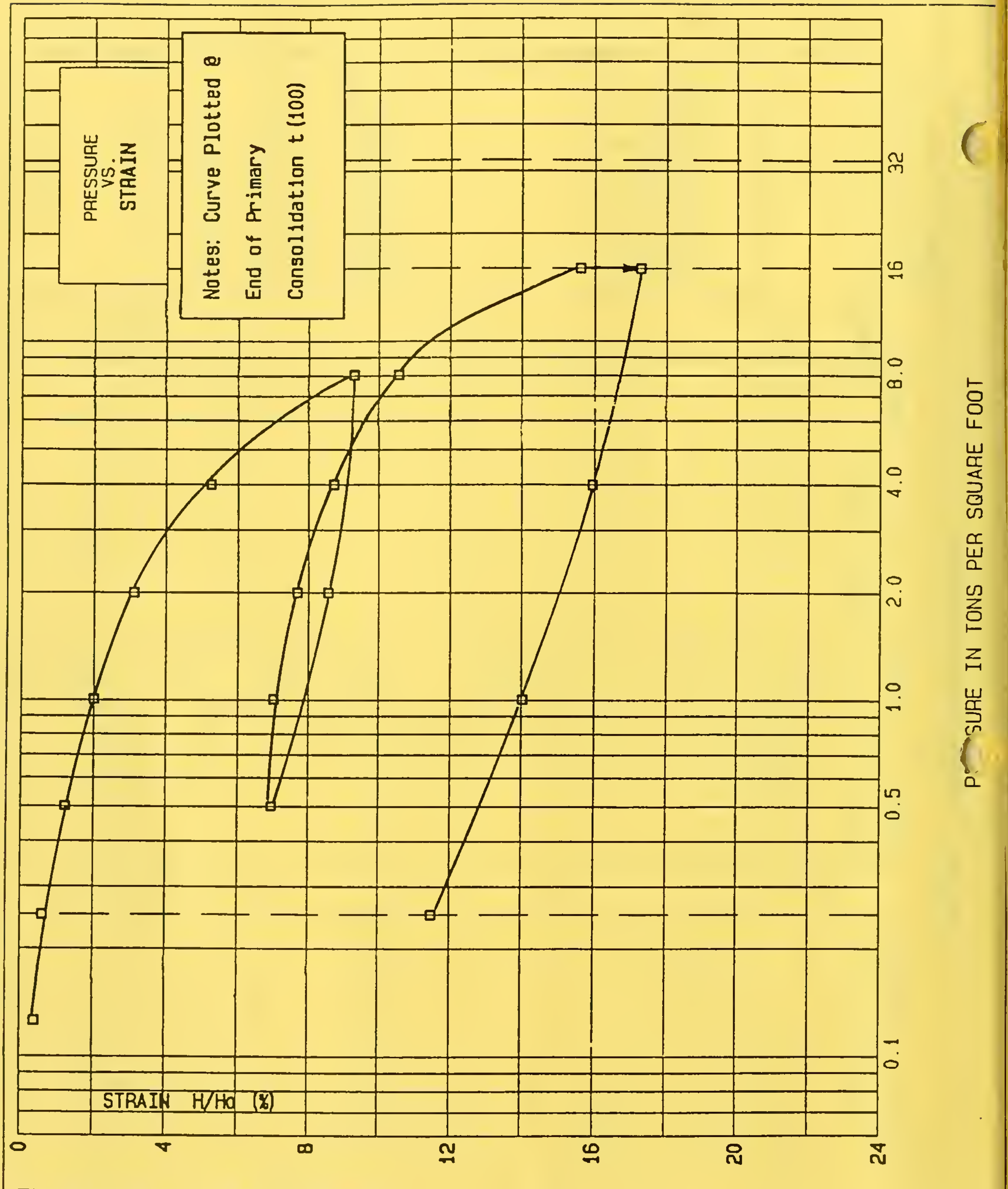
Project Name ACDC-PARCEL B

LABORATORY TESTING DATA SUMMARY

Reviewed by
Date
Required

Project No. 12535 Project Engr. F. GRYNKEWICZ Assigned By F. GRYNKEWICZ Date Assigned JUNE 91

Boring or Test Pit No.	Sample No.	Depth ft.	Lab No.	IDENTIFICATION TESTS								DENSITY		STRENGTH TESTS					CONSOL.	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	MAX (pcf) / W_{opt} (%)	Permeability cm/sec	Torvane or Type Test	$\bar{\sigma}_c$ psf	Failure Criteria	$\sigma_1 - \sigma_3$ or τ psf	Strain %	$\frac{C_c}{1 + e_0}$	
GZB-1	T-3	60-62	5		Average Total Unit Weight (60.0-61.9') = 124.7 Pcf															Olive Grey CLAY & SILT of medium plasticity, stiff consistency, little f-c Sand, little (+) f-c Gravel.
		60.3		31.4										Tv= 0.62 tsf						
		60.4-60.6		32.1	39	20														
		60.8		29.9										Tv= 0.82 tsf						
		61.4		31.3										Tv= 0.64 tsf						
		61.4-61.6		30.5	39	20														
	T-4	70-72	6		Average Total Unit Weight (70.0-71.5') = 115.0 Pcf															Olive Grey CLAY & SILT of medium plasticity, medium to stiff consistency
		70.3		38.3										Tv= 0.39 tsf						
		70.5		38.1										Tv_r=.055 tsf						
		70.5-70.6			39	21														
		70.8		35.7										Tv= 0.70 tsf						
		70.8-71.0		38.4	40	21					83.1								0.16	
		71.1		35.8										Tv_r=0.12 tsf						
		71.2		43.0										Tv= 0.40 tsf						



SOIL DESCRIPTION: Olive Grey CLAY & SILT

SAMPLE DIAM. 2.5 IN. LIQUID LIMIT 45 % PLASTIC LIMIT 23 % SPECIFIC GRAVITY 2.70

	WATER CONTENT, %	DRY UNIT WEIGHT, pcf	VOID RATIO	SATURATION, %	SAMPLE HEIGHT, INCH
INITIAL	37.50	84.95			0.80
FINAL	31.50	95.72			0.71

ACDC-PARCEL B
CONSOLIDATION TEST

BORING NO. GZB-4
SAMPLE T-2
DEPTH 31.3-31.4'
TECH. BM
REVIEWER DAS

TEST SERIES NO. C2.1
DATE 7/30/91

FILE 1253

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

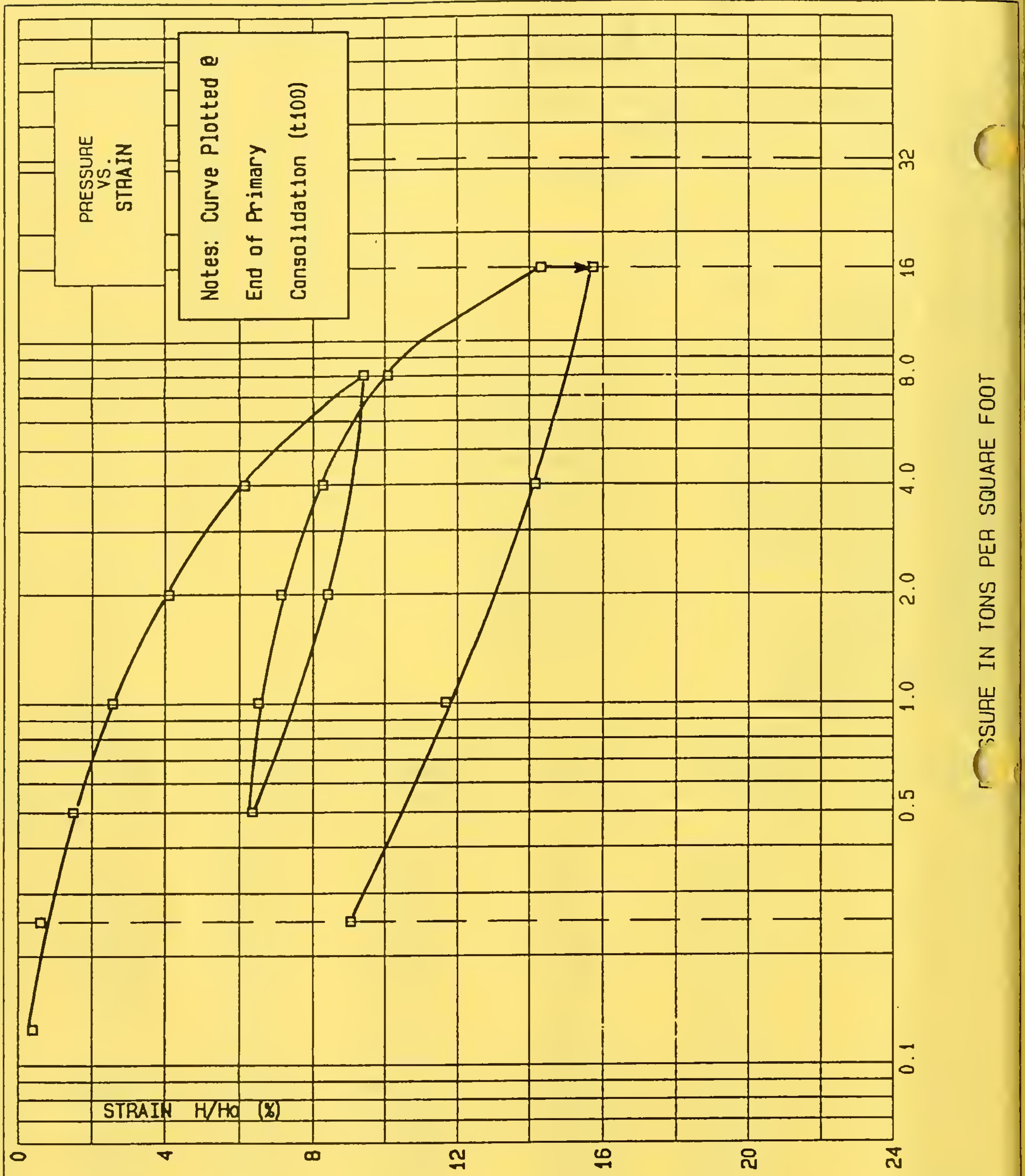
```
ob Number .......... 12535
Project Name ........ ACDC-PARCEL B
est Number ......... C2.1
ample Description .. Olive Grey CLAY & SILT
ring Number ....... GZB-4
mple Number ....... T-2
epth ............... 31.3-31.4'

Technician .......... BM
eviewer ............ DAS

NOTES: Curve Plotted @
End of Primary
onsolidation t(100)

Specific Gravity ......... 2.7000E+00
ample Dry Weight ........ 8.7570E+01
ample Diameter .......... 2.5000E+00
Initial Void Ratio ....... 0.0000E+00
nitial Sample Height .... 8.0000E-01
inal Sample Height ...... 7.1000E-01
Initial Water Content .... 3.7500E+01
Final Water Content ...... 3.1500E+01
iquid Limit ............. 4.5000E+01
lastic Limit ............ 2.3000E+01
Initial Saturation ....... 0.0000E+00
inal Saturation ......... 0.0000E+00
50 data excluded
T90 data included

ncrement      Pressure      Final      Percent      Void      T90       Cv (T90)
umber          (TSF)        Dial       Strain       Ratio    (min)     (/10000)
                                                                       (Cm²/sec)  Cα
     1          0.000         0.0        0.00       0.983
     2          0.125        33.0        0.41       0.975
     3          0.250        51.0        0.64       0.971      1.4       103.12
     4          0.500        99.0        1.24       0.959      2.0        71.58
     5          1.000       161.0        2.01       0.943      2.0        70.59
     6          2.000       249.0        3.11       0.922      2.3        60.22
     7          4.000       420.0        5.25       0.879      4.8        27.91
     8          8.000       745.0        9.31       0.799      6.8        18.44
     9          2.000       687.0        8.59       0.813
    10          0.500       558.0        6.97       0.845
    11          1.000       562.0        7.02       0.844      2.3        54.86
    12          2.000       617.0        7.71       0.830      2.6        48.15
    13          4.000       699.0        8.74       0.810      2.6        47.26
    14          8.000       845.0       10.56       0.774      4.0        29.77
    15         16.000      1249.0       15.61       0.674      7.8        14.13
    16         16.000      1384.0       17.30       0.640                             .0065
    17          4.000      1277.0       15.96       0.667
    18          1.000      1122.0       14.02       0.705
    19          0.250       921.0       11.51       0.755
```



SOIL DESCRIPTION: Olive Grey CLAY & SILT

SAMPLE DIAM. 2.5 IN. LIQUID LIMIT 40 % PLASTIC LIMIT 21 % SPECIFIC GRAVITY 2.70

	WATER CONTENT. %	DRY UNIT WEIGHT. pcf	VOID RATIO	SATURATION. %	SAMPLE HEIGHT. INCH
INITIAL	38.40	83.06			0.80
FINAL	34.40	91.27			0.73

ACDC-PARCEL B
CONSOLIDATION TEST

BORING NO. 8ZB-1
SAMPLE T-4
DEPTH 70.8-71.0'
TECH. BM
REVIEWER DAS

TEST SERIES NO. C5.1
DATE 7/30/91
FILE 1253

GZA GEOENVIRONMENTAL, INC.
ENGINEERS AND SCIENTISTS

ob Number 12535
Project Name .... ACDC-PARCEL B
est Number C6.1
ample Description .. Olive Grey CLAY & SILT
ring Number GZB-1
ple Number T-4
epth .... 70.8-71.0'

Technician .... BM
eviewer .... DAS

NOTES: Curve Plotted @
End of Primary
onsolidation (t100)

Specific Gravity .... 2.7000E+00
ample Dry Weight .... 8.5620E+01
mple Diameter .... 2.5000E+00
Initial Void Ratio .... 0.0000E+00
nitial Sample Height 8.0000E-01
inal Sample Height 7.2800E-01
Initial Water Content .... 3.8400E+01
Final Water Content ...... 3.4400E+01
iquid Limit .... 4.0000E+01
astic Limit .... 2.1000E+01
Initial Saturation .... 0.0000E+00
inal Saturation .... 0.0000E+00
50 data excluded
T90 data included

crement umber	Pressure (TSF)	Final Dial	Percent Strain	Void Ratio	T90 (min)	Cv (T90) (/10000) (cm²/sec)	Cα
1	0.000	0.0	0.00	1.028			
2	0.125	33.0	0.41	1.020			
3	0.250	50.0	0.63	1.016			
4	0.500	120.0	1.50	0.998			
5	1.000	206.0	2.57	0.976			
6	2.000	330.0	4.12	0.945			
7	4.000	491.0	6.14	0.904			
8	8.000	753.0	9.41	0.837			
9	2.000	675.0	8.44	0.857			
10	0.500	510.0	6.37	0.899			
11	1.000	523.0	6.54	0.896	3.6	35.46	
12	2.000	571.0	7.14	0.884	6.8	18.62	
13	4.000	664.0	8.30	0.860	7.8	15.93	
14	8.000	808.0	10.10	0.824	9.0	13.36	
15	16.000	1145.0	14.31	0.738	13.0	8.65	
16	16.000	1259.0	15.74	0.709			.0041
17	4.000	1133.0	14.16	0.741			
18	1.000	936.0	11.70	0.791			
19	0.250	725.0	9.06	0.845			

LABORATORY TEST PROCEDURES

ACDC-PARCEL B
BOSTON, MASS.
12535

1. The following tests were performed with the noted ASTM test designation:

TEST	ASTM DESIGNATION
Consolidation Properties	D2435-80 (see Item 2)
Moisture Content	D2216-80
Liquid and Plastic Limits	D4318-84

2.0 Test Procedures for Consolidation Properties (Addenda)

The procedure outlined under ASTM designation D2435-80 was used as a guide during consolidation testing. Undisturbed samples were trimmed by means of a soil lathe, carving each specimen to test dimensions of 2.50 inches diameter and 0.80 inch height. The sample was weighed, placed in a consolidometer and there seated under a load of 1/8 tons per square foot. This load was sequentially doubled (1/8-1/4 tsf, 1/4-1/2 tsf, 1/2-1 tsf, etc.).

All of the test samples were rebounded after the maximum past pressure (σ_{vm}) was defined. Unloading was accomplished in two steps to 1/2 tsf.

Using the doubling sequence established during the initial loading, the sample was then reloaded to a maximum of 16 tons per square foot. Each load and/or unload was allowed to act for a controlled time increment. In this case, the increment used was the end of calculated primary consolidation (t100), except for the final load which was held for a sufficient time period to define the coefficent of secondary consolidation. During application of these and all other loads, the change in thickness of the sample was recorded at regular time intervals.

A final rebound sequence followed (16-4, 4-1, 1-1/4), and the sample was removed, weighed, and oven dried for water content determination.

SECTION 02350 - PILE FOUNDATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

[*]A. **The Contractor shall include in its base bid all work of this Section except dynamic testing indicated to be the Owner's responsibility.**

[*] 1. **The Architect estimates that approximately 16,000 linear feet of piles are required; the Contractor shall base its bid on this estimate. Additional or lesser linear footages will be paid/deducted at the unit price as established in Section 01025.**

B. Provide labor, materials, and equipment necessary to complete the work of this Section, and without limiting the generality therefore, includes:

1. Providing complete precast, prestressed concrete piles to support a maximum design load of 95 tons.
2. Furnishing and installing all piles, including splicing, to the required bearing stratum and/or driving resistance as specified hereinafter.
3. Transporting all piles to the site including obtaining necessary permits and police details.
4. Establishing lines and grades, including layout of piles in the field.
5. Cutting off all piles at the proper grade as shown on the Drawings.
6. Coordinating and determining the proper relationship of the work to the structure and to the work of all other trades.

[*] 7. **[Assist Owner in performing]** High Strain Dynamic testing **[during the driving and restriking of pre-cast pre-stressed concrete piles conforming to ASTM D 4945]** as specified in Part 3. [ ] Testing will be performed on approximately five (5) initial piles, and up to ten (10) percent of production piles.

[*] 8. Perform static load testing **[with documented results, preparation of work area, and dismantling and removal of equipment and load,]** as specified in Part 3 [ ].

9. Adjusting installation techniques to minimize vibrations

to adjacent structures and buried utilities.

10. Examine all other Sections of the Specifications for requirements which affect work of this Section, whether or not such work is specifically included in this section.

C. Related Sections: The following sections contain requirements that relate to this Section:

1. Section 02200, "Earthwork", for excavating and backfilling for piles and pile caps and grade beams bents, including controlling water.

[*] 2. and 3. Deleted.

4. Section 03300, "Cast-in-place Concrete", for concrete materials.

[*]1.3 QUALITY ASSURANCE:

[*]A. The Contractor shall submit evidence of suitable experience in this type of installation and of the competence and experience of the person in charge at the site. As a minimum, the Contractor shall provide evidence of having successfully completed at least three projects of a scope comparable to this project. Approval of the Contractor's experience shall be based solely on the judgment of the Architect.

[*]B. All work performed under this Section shall conform to generally accepted engineering standards and shall be of highest quality, workmanlike construction. Furthermore, unless modified by the Contract Documents, all work shall comply with the following regulations and standards:

[*] 1. Massachusetts State Building Code, latest edition.
[*] 2. AASHTO/PCI Joint Committee Prestressed Concrete Pile Recommendations, latest edition.
[*] 3. ASTM D1143 - Testing Piles Under Static Axial Compressive Load.

[*]C. Maintain sufficient protection and heating during testing, if necessary, to limit wind and temperature differences which could affect readings.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Complete pile shop drawings and design calculations bearing the stamp of a Professional Engineer, registered in the Commonwealth of Massachusetts, as required to demonstrate compliance with contract documents. Drawings shall include all structural and reinforcing details and splice design. Any departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the shop drawings. Approved departures shall be made at no additional cost to the Owner.

[*]B. Deleted.

C. Submit manufacturer's data on pile-driving hammer and a drawing showing details of cap block, cushion block, and driving head assembly. If a follower is proposed, submit details including dimensions, materials, cushions, and other information. Followers may only be used if approved by the Architect.

[*]D. Submit details of the proposed driving system [ ] to the Architect for wave equation analyses.

E. Submit the concrete mix design and strength test data on which the mix design is based. Submit test reports prepared by an independent testing laboratory certified by the Commonwealth of Massachusetts.

F. Submit all details for production, curing, and shipping of piles, and note the date of manufacture and shipping of each pile on the project.

G. Submit weekly drawings of as-driven pile locations and final as-driven pile location plan certified by a Registered Land Surveyor or a Registered Professional Engineer.

[*]H. Provide detailed information and drawings on static load test method, type and layout of measuring equipment, reaction type and layout, protective covering, telltales safety devices, and calibration equipment. Provide space, approximately twelve inches (12"), within the load test setup for placement of a load cell and associated steel shims. Load cell will be provided by the Architect and paid for by the Owner.

[*] 1. Provide a calibration record for the hydraulic jack to be used for the test. The jack, including the complete assembly of pumps, gages, and ram to be used in the tests, shall be calibrated for this project by an approved testing laboratory. A minimum of three (3) calibration runs shall be performed at ram extensions of one inch (1"), mid-range, and one inch (1") less than full range.

[*] 2. Document the test equipment and layout used, method of calibrating and recording, reference points, test results, recommendation or modification of piling method used.

1.5 SUBSURFACE SOIL DATA AND SITE CONDITIONS:

A. Soil Data:

1. It is the obligation of the Contractor to examine the site, to verify all dimensions in the field, and to review logs of borings, jar soil samples, records of investigations, and other pertinent data, and to employ all other means at his disposal to familiarize himself completely with conditions existing at the site. At his own expense, the Contractor may take whatever additional borings or explorations he deems necessary.
2. Jar soil samples of borings performed in 1991 may be examined upon request to the Architect. Additional information is contained in a report prepared by GZA GeoEnvironmental, Inc., (GZA) dated August 1991, and is available from the Owner.

B. Utilities: The Contractor shall visit the premises to familiarize himself thoroughly with all details of the work and of working conditions, to verify all dimensions in the field, and to advise the Architect of any discrepancy before performing any work. The Contractor shall consult official records of existing utilities, both surface and subsurface, and their connections, and shall fully inform himself of all existing conditions and limitations as they apply to his work and of the extent and character of the work required under this section and its relation to all other construction work.

C. Utilities Left in Place: Existing utilities found on the project site which are to remain shall not be disturbed or damaged. Provisions for protection of same shall be made in accordance with the requirements of authorities having jurisdiction over same.

1.6 LAYOUT AND RECORDS:

A. Piles shall be located and staked by the Contractor, and the Contractor shall maintain all location stakes, establish all elevations required, and be responsible for the correct locations of all piles.

[*]B. Deleted.

C. The Contractor shall employ a licensed Registered Land Surveyor or a Registered Civil Engineer, familiar with this type of work, who shall establish lines and levels and the accurate locations of all piles after driving. The Contractor shall be responsible for correct locations of piles.

D. The Contractor shall keep a record, independent of that which may be made by the Architect, or authorized representative, of all pertinent data relative to the installation of piles. This record shall be available for the Architect's, or authorized representative's inspection, and shall be transmitted to him as he directs. This record is to include for each pile:

1. Date and time of installation.
2. Total penetration as shown by tip elevation.
3. Cutoff elevation.
4. Layout of pile locations.
5. Final as-driven location of each pile as prepared by the Contractor's Surveyor.
6. Final penetration resistance recorded as number of hammer blows per inch for final six (6) inches of driving.
7. Hammer model and energy.

PART 2 - PRODUCTS

2.1 PRECAST, PRESTRESSED CONCRETE PILES:

A. Piles: Piles shall be minimum twelve (12) square inches, precast, prestressed concrete piles, designed and manufactured in accordance with the joint AASHTO and PCI Committee recommendations, and AASHTO Standard Specifications for Highway Bridges latest revisions, to support the design load of 95 tons.

B. Splices: Under normal circumstances, no splices are permitted.

1. Pile Buildups, if required shall be submitted for approval.

C. Concrete: Twenty-eight (28) day compressive strength shall be no less than five thousand pounds per square inch (5,000 psi). Piles shall not be delivered to the field until the concrete has obtained a strength of three thousand, five hundred pounds per square inch (3,500 psi), as verified by test cylinders, and in no case less than seventy-two (72) hours after casting.

2.2 TYPE OF PILE:

A. The foundation design is based upon a precast concrete pile of 95 ton design load. The pile shall obtain an ultimate capacity of 2.25 design load. The bid shall be based on this type of pile only.

B. Substitute Foundation Types Hereby Known as Substitutes:

1. Substitutes may be submitted after the Contract has been awarded if given the approval of the Architect.
2. No piles that are wood in any part will be substituted.

C. Requirements for Substitutes:

1. All substitutes must be capable of developing required ultimate capacity.
2. Proposal of substitutes must be accompanied by substantiating data, including but not limited to the following:

    a. Complete physical characteristics of the pile/caisson.
    b. Calculations indicating pile/caisson capacity development.
    c. Proposed installation procedure, equipment and modification to specifications.
    d. Unit cost per foot of pile/caisson which shall include: cutting, capping, and supplying and driving piles.

3. All pertinent information for substitute piles/caissons shall be submitted to the Architect for review at least ten (10) working days prior to commencing any work.
4. The Contractor shall bear the costs of design and review of substitute whether or not the substitute is accepted.
5. The Architect will reject or accept proposed substitutes ten (10) days after submission of same.

[*]2.3 TESTING MATERIALS:

[*]A. Provide equipment, reaction system, and load instrumentation conforming to ASTM D1143.

PART 3 - EXECUTION

3.1 DRIVING EQUIPMENT:

A. Hammers shall be either steam, air, or diesel hammers, having a rated energy of not less than nineteen thousand (19,000) foot-pounds and a minimum ram weight of three thousand (3,000) pounds. The valve mechanism and other parts of hammers shall be maintained in a condition which will ensure that the length of stroke and number of blows per minute for which the hammer is designed will be realized. Steam and air hammers shall have boiler/air capacity which is not less than that specified by the hammer manufacturer; boiler and compressor shall have either pressure gauges or other devices calibrated in a manner which will allow hammer energy to be determined. When the determination of the final driving resistance is being made, the hammer shall be operated at a speed not less than ninety (90) percent of the maximum blows per minute or energy for which the hammer is rated by the manufacturer. Required final driving resistance, as stated in this specification, shall be adjusted to compensate for hammer speeds or energy deviating from those stated by the manufacturer.

The Contractor shall maintain the boiler or air pressure recommended by the manufacturer and shall employ hose and connections of the proposed sizes. Pile and hammer shall be held in alignment by leads and in a manner which will ensure that the centerline of the hammer is an extension of the centerline of the pile. The driving head shall fit the top of the pile and shall extend down the sides of the pile not less than four (4) inches. Diesel hammers should have a bounce pressure gauge or markings on the ram to permit measurement of actual hammer operating energy.

B. Leads of the pile-driving rig shall be fixed at two (2) points; the points shall be at least half the length of the leads apart in order to maintain the pile and hammer in axial alignment at the correct plan location during the entire driving operation. The leads shall extend down to the lowest point at which the hammer must operate.

C. Cap block cushion shall consist of multiple layers of aluminum-micarta discs, stacked in a steel housing with steel top and bottom plates. Alternative arrangements, if proposed, shall be demonstrated to be equally efficient in transmitting the energy of the hammer and in preventing damage to the top of the pile. No asbestos material shall be permitted in the cap block.

D. Cushion block between hammer and top of pile shall consist of a stack of plywood. Alternative arrangements, if proposed, shall be demonstrated to be equally efficient in transmitting the energy of the hammer and in preventing damage to the top of the pile. The use of a cushion consisting of wood chips, wood shavings, wire rope, or other materials with highly compressible properties shall not be permitted. Plywood pile cushions more than six (6) inches thick will not be permitted without the specific approval of the Architect. Cushion blocks shall be replaced at regular intervals as required by the Architect or authorized representative. Cushion blocks shall not be replaced during the final three (3) inches of driving.

E. The proposed pile-driving equipment shall be subject to the approval of the Architect or authorized representative. Approval will be granted after review of the Contractor wave equation analyses and shall be secured before pile-driving starts. The same equipment shall be used for all initial piles and production piles. Approval by the Architect or authorized representative of the Contractor's equipment shall merely signify that the Contractor may make an initial trial installation with the proposed equipment. Approval will not relieve the Contractor of his responsibility for providing and installing piles capable of supporting the design loads by whatever means necessary, including changing the equipment and procedures from those used in the initial trial.

F. The use of followers will only be permitted with the prior approval of the Architect. Driving criteria may have to be altered if a follower is used. Submit details of follower at least one week prior to proposed use.

3.2 INSTALLATION:

A. General:

[*] 1. [ ] Contractor shall mark off each foot of the pile, log blows per foot, and log blows per inch for the final six (6) inches, unless first take-up is abrupt at virtual refusal (less than one-half (1/2) inch penetration for ten (10) blows). Pile marking is detailed later in text.

2. Piles shall be driven through overburden soils into the underlying glacial till/bedrock bearing stratum, to the specified final driving resistance.

B. Driving Criteria:

1. Prior to the start of pile driving, the Architect shall perform wave equation analyses of his proposed pile driving system. The analysis shall show that the driving system is suitable to provide an ultimate bearing of 2.25 times the design load (95 tons) without damage to the piles, at a penetration resistance of no more than 8 blows per inch. The location of the required ultimate bearing capacity shall be on the linear portion of the resistance versus blow count curve. The analysis shall indicate that driving stresses are below the levels specified herein.

2. The Contractor is responsible for placing piles to such depths that will safely develop the ninety-five (95) ton design load. Maximum tensile stresses and compressive stresses during driving shall be limited to the following:

maximum compressive stress = 0.85 f'_c - prestress

maximum tensile stress = $3\surd(f'_c)$ + prestress

where:
f'_c = specified minimum compressive strength of

concrete, psi

[*] 3. Cease driving if not less than one-half (1/2) inch penetration under ten (10) blows to limit overstressing. The [Architect] [ ] reserves the right to change the blow count criteria after reviewing results of pile driving analyzer tests and wave equation analyses provided by the Contractor.

4. The Contractor will be permitted the use of a hammer of a type and size which he has found to be adequate, provided that the hammer develops no less than ninety (90) percent of its rated capacity.

   a. Rated energy of hammer: at least nineteen thousand (19,000) foot-pounds.
   b. Ram weight: at least three-thousand (3,000) pounds.
   c. Restrict energy of hammer as necessary to prevent tensile failure of concrete piles under soft driving and when penetrating through the fill layer into the overlying organics stratum.

5. When the contractor stops operations for a period of time (such as for mechanical problems) before a pile is driven to the required driving resistance, the pile will be "re-started". Any pile restarted shall be driven at least three (3) inches before reaching final driving resistance unless refusal, defined as less than one-half (1/2) inch penetration for ten (10) blows, is achieved. The Architect or authorized representative reserves the right to require the Contractor to test, with the pile driving analyzer, piles which reach refusal at less than three (3) inches penetration. The Architect or authorized representative reserves the right to reject any pile which reaches refusal before achieving three (3) inches penetration based on pile driving analyzer results.

D. Pile Heave:

1. Heave checks will be made on all piles. Immediately after the pile reaches the required resistance, the Contractor shall set up a reference elevation on the pile to an accuracy of one-hundredth (0.01) of a foot. After driving all piles within thirty (30) foot radius surrounding the pile, the reference elevation shall be checked, and any pile showing more than four hundredths (0.04) of a foot heave shall be re-driven. Heave checking and re-driving will continue until the Architect or authorized representative is assured that pile heave does not occur. The Architect or authorized representative may reduce the thirty (30) foot radius zone to a smaller zone pending results of the initial heave checking.

Where pile point heave is indicated, retapping (backdriving) of the piles will be required in sufficient pattern to establish that all piles have the required specified final resistance. Criteria for redriven piles are as follows:

a. Drive pile a minimum of two (2) inches or a minimum of fifty (50) blows, whichever occurs first.
b. If pile penetrates less than two (2) inches after fifty (50) blows, stop driving.
c. Otherwise, drive pile at least to original tip elevation and thereafter to the original final driving resistance.

2. In soils in which the driving of piles causes the points of previously driven piles to heave, special consideration will be given to the sequence of pile installation.

3.3 TOLERANCES:

A. General:

1. All piles shall be located within three (3) inches of the design position in plan, except as noted below.
2. Where piles as installed exceed the specified tolerance, the Contractor shall remove the pile and install a replacement pile. In addition, the Architect shall determine locations and the need for additional corrective measures.
3. The installation of replacement piles and other corrective measures shall, in all cases, be subject to approval by the Architect and shall be performed by the Contractor at no additional cost to the Architect.
4. Whenever misalignment of piles necessitates structural redesign, the cost of such redesign shall be deducted from sums otherwise due to the Contractor under the Contract.
5. The tops of all piles shall be cut off within one-half (1/2) inch of the elevations indicated on the Drawings.
6. Any pile damage or location tolerance excesses or excessive driving time resulting from the selection of a hammer not suited for the job will be the responsibility of the Contractor and will be corrected as the Architect directs at no additional cost to the Owner.

3.4 REJECTED PILES:

A. Obstructions:

1. Where obstructions or very dense granular layers make it impossible to install certain piles at locations shown on the Drawings and/or to the proper depths, the Contractor shall resort to all usual methods for pile installation, including spudding, jetting, and excavation. Excavating to a depth of five (5) feet below cutoff elevation and removing obstructions up to one (1) cubic yard in volume shall be considered a usual method and shall be at the Contractor's expense.

   If, in the judgment of the Architect, the Contractor is unable to complete the proper installation of any pile, by and after resorting to such methods, the Architect may order than an additional pile or piles be driven or that other remedial action be taken, for which the Contractor will be paid in accordance with the unit prices established in this contract. Any pile abandoned because of obstructions encountered before reaching the anticipated bearing depth will be cut at cutoff elevation or pulled out, and the open hole filled with lean concrete at the discretion of the Architect or authorized representative and at no additional cost to the Owner.

2. If the Architect or authorized representative determines that obstructions more than five (5) feet below cutoff elevation or greater than one (1) cubic yard in volume should be removed by excavation, the Contractor will be reimbursed for the additional work of removing obstructions and backfilling beyond that included in the "usual methods" on a "time and materials" basis. No additional payment for removal of any obstruction will be made unless approval of such work, including agreement for extra compensation for such work, has been made in writing by the Architect in advance of execution of the work.

3. Piles abandoned because of obstructions encountered shall be cut at design cutoff elevation or pulled out at the discretion of the Architect. In either case, the Contractor will be paid on the basis of the pile length driven below design cutoff elevation for those piles which cannot be driven to the required depth by the "usual methods."

B. Broken Piles:

1. At no cost to the Owner, piles which break above ground or within ten (10) feet of the ground surface shall be replaced or cut off and spliced (only as permitted in paragraph 2.01.B.2) to an intact section at the discretion of the Architect. If requested, the Contractor shall excavate to ten (10) feet below cutoff elevation to investigate suspected breaks.

2. Piles which are suspect to a potential break, based upon driving logs, but in which the break cannot be verified because of depth, may be rejected at the discretion of the Architect or authorized representative. Installation of replacement pile(s) and other corrective measures, including design changes and structural changes to the pile cap required because of a broken pile, shall be borne by the Contractor.

C. Defective Piles:

1. Defective piles will be replaced either by extracting the defective pile or by enlarging the group and driving additional piles, as the Architect may approve. Such replacement or addition shall be solely at the expense of the Contractor and without compensation.
2. A pile exhibiting any one of the following conditions will be deemed a defective pile:

    a. Piles exceeding the three (3) inch placement tolerance, unless otherwise specifically accepted by the Architect.
    b. Any pile which shows signs of being broken, spilled, or otherwise damaged during driving, including damage to the pile tip.
    c. Any pile which, through the encountering of difficulties arising from the equipment or materials used, cannot be properly installed.

3.5 OBSERVATIONS AND TESTS:

[*]A. Observations: All work performed under this Contract shall be subject to observation and tests by the Architect or authorized representative [ ]. The Contractor shall cooperate with the Architect or authorized representative and shall provide convenient access to all parts of the work for the purpose of observations to check compliance with the plans and specifications. [ ].

B. Access: The Contractor shall provide to the Architect or authorized representative free and safe access to the work at all times.

C. Length Markings: Each pile shall be marked in readily visible markings showing length from the tip in at least one (1) foot intervals. Each five (5) foot interval shall be marked with a numeral. The pile shall be marked in one (1) inch intervals near the butt at the segment where final take-up is expected. Alternatively, provide a rule marked in inches close to each driven pile location to permit observation of final penetrations blows per inch.

1. The Contractor shall maintain an area around pile so

that the rule may be placed within two-feet of pile being driven. Under no circumstances shall final driving resistance be determined from markings made on the pile hammer. Where piles are driven below the deck level, a splice shall be installed or the area around the pile excavated such that the pile penetration can be observed and the hammer does not come in contact with the deck.

[*]D. High Strain Dynamic Pile Testing: [ ] Five (5) initial piles and up to approximately ten (10) percent of production piles [will be tested] using a Dynamic Pile Analyzer. Testing will include both initial drives and restrikes and shall be in [performed as follows] [ ]. These test data will be used to verify driving stresses and allowable pile loads.

[*] 1. The Owner's representative shall provide all necessary equipment required for the performance of the dynamic testing of the piles. The Contractor shall provide support the Owner's representative during conductance of the tests. Approximately 20 minutes will be required to prepare the test piles for attachment of velocity and force transducers prior to test pile driving.

[*] 2. The Owner's representative shall perform High Strain Dynamic Testing with a minimum of three (3) days advance notice given to the Contractor by the Owner's representative.

[*] 3. The Owner's representative shall fasten a pair of transducers and a pair of accelerometers in place prior to testing. The pile shall be driven and tested until an ultimate capacity of 2.25 times the design capacity has been obtained.

[*] 4. Restrike testing shall be performed after a waiting period of at least 48 hours.

[*] 5. The results of the dynamic testing shall be printed by the pile driving analyzer and shall include for each blow count selected by the Architect or authorized representative, a combination of the following quantities: bearing capacity from the Case Goble Method; input and reflection values of force and velocity; maximum transferred energy; maximum compression and tensile forces; velocity and displacement; blows per minute; value of upward and downward traveling force wave; and ram stroke and corresponding blow sequence. All of the above information shall be supplied to the Contractor within twenty-four (24) hours of the testing. All signals shall be recorded on magnetic tape or computer disc and made available upon request. A written report summarizing generated data and computed bearing capacities will be prepared by the Owner's representative.

[*]E. Static Load Testing: One (1) initial pile shall be

subjected to static load testing to three (3)times design load or failure as [follows] [ ] prior to the start of production pile driving:

[*] 1. Verify site conditions will support cribbing and load for testing purposes.
[*] 2. Establish working elevations for test equipment.
[*] 3. Perform load test on pile and document test procedures and results in accordance with ASTM D1143.

    a. Apply load to pile by hydraulic jack acting against a reaction frame. Reaction load shall be at least one hundred and twenty-five percent (125%) of the maximum test load.
    b. Measure movements of pile butt by at least three (3) independent methods specified in ASTM D1143. One (1) method shall be by three (3) dial gages accurate to 0.001 inch. Space dial gages at one hundred and twenty degrees (120°) around the pile at equal distance from the center of the pile.
    c. Use ASTM D1143 quick loading procedure. Apply load in 20 kip increments.
    d. Measure movements of the top of each telltale relative to pile top with a dial gage reading to 0.001 inch.

[*] 4. Wait at least ninety-six (96) hours after pile is in place and concrete has reached required strength before loading.
[*] 5. Subject test pile to three (3) times design load or failure.
[*] 6. If tested pile does not conform to requirements, perform additional testing of other piles at no additional cost to the Owner.
[*] 7. The Architect or its representative will observe and record all load-settlement or deflection data during the load tests and monitor reaction piles for uplift. The Contractor shall provide personnel at the site as required during testing, to operate all equipment necessary for application and maintenance of all load increments on test piles.

F. Initial Piles:

1. Drive at least five (5) initial piles to the preliminary driving criteria of blow counts specified by results of the wave equation analyses at production pile locations. The piles shall be driven near different cap locations and spaced out as practical in order to evaluate driving experience and pile lengths at different locations. No additional piles will be driven until the results of the High Strain Dynamic Testing and static load test on the initial piles (including the restrike testing) have been assessed and the establishment of final driving

criterion completed.

2. Initial piles placed in permanent locations may be incorporated into work if, after satisfactory completion of High Strain Dynamic Tests, piles are approved for inclusion in work by the Architect.
3. Initial piles shall be cast with three telltale anchor systems comprised of groutable quick disconnect bayonet type anchors as manufacture by Geokon, Inc., Lebanon, N. H.. Provide 3/8-inch steel sleeves to the pile butt. One telltale shall be located 1 foot off the bottom of the pile, the second 15 feet off the tip and the third at 30 feet above the pile tip.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

A. Mobilization: Mobilization and demobilization including all equipments and materials, pre-augering of pile locations, surveying and related services as specified herein, are included in the base contract amount.

[*]B. Assisting the Owner's representative in performance of dynamic pile testing is included in the base contract bid, including mobilization, demobilization, all contractor's support, labor, and incidentals necessary for attaching the transducers and accelerometers to the piles; performing the dynamic analysis in accordance with ASTM D 4945-89.

[*]C. Performance of static pile load test, including constructing and removing the test load reaction system; driving and removing temporary piles and supports; furnishing protective coverings; operating and reading jacks, gages, and related equipment; and all labor, materials, equipment, tools, and incidentals necessary for proper execution of the pile load test as specified, is included in the base contract amount.

[*] 1. The cost of any extra cutoff and steel reinforcement installation required for load test execution shall be included in the load test price.

[*]B. [ ] Piles: Piles will be measured as the linear length of installed piles, accepted by the Owner or authorized representative, from tip elevation to final cutoff. Test piles (initial piles) will be measured for payment.

C. Preaugering: Although preaugering is not expected, if it was required by the Owner or authorized representative, will be measured on a per linear foot basis from final cutoff to a completed depth.

D. Obstruction: Obstruction removal by unusual methods as defined by paragraph 3.04.A.2 and only if it was performed under the direction of the Architect or authorized representative will be measured on a per cubic yard basis only. Downtime required to remove the obstructions will not be measured separately.

4.2 PAYMENT:

[*]A. [ ] Piles: Each Contractor shall state, as called for on the FORM FOR GENERAL BID, **[a total price based on the estimate of 16,000 linear feet of piles as indicated, and]** a unit price per lineal foot (LF), ninety-five (95) ton design load precast, prestressed concrete piles complete, in accordance with the Drawings and these Specifications, measured between plan cutoff and inferred pile tip elevations. The unit price will include full compensation for furnishing and installing complete all piles indicated on the Plans and Specifications [ ].

[*]C. Deleted.

D. Preaugering: Although preaugering is not expected, if it was directed by the Owner or authorized representative, payment will be made at the bid unit price, including augering, spoil removal, and provision and mobilization of all equipment and materials required for same.

E. Obstruction: Payment for obstruction removal by unusual methods as defined by paragraph 3.04.A.2 and only if it was directed by the Owner or authorized representative, will be made at the bid unit price per cubic yard basis; including removal and disposal, backfilling, and provision and mobilization of all equipment and downtime required for same.

END OF SECTION 02350

SECTION 10800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes residential toilet and bath accessory items as indicated.

1.3 SUBMITTALS:

A. General: Submit the following according to Conditions of Contract and Division 1 Specifications Sections.

B. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.

C. Setting drawings where cutouts are required in other work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.

1.4 QUALITY ASSURANCE:

A. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

B. Grab Bars: Grab bar units shall be installed and anchored as required to resist a 250 lb. concentrated load, applied in any direction, for five minutes without permanent deflection or damage to grab bar or substrate.

1.5 PROJECT CONDITIONS:

A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation and operation of toilet accessory items.

1. Coordinate installation of blocking for wall hung items.

B. Fire Rated Assemblies: Where a recessed unit is indicated for installation at a fire-rated gypsum board assembly, coordinate with work of other sections to ensure that proper fire rating is maintained behind installation.

1. Where provision for maintaining fire rating is not feasible, advise Architect and substitute surface mounted unit.

1.6 WARRANTY:

A. Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within warranty period.

B. Warranty Period: 10 years from date of Substantial Completion.

C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering toilet accessories that may be incorporated in the Work include, but are not limited to, the following:

1. A & J Washroom Accessories.
2. American Specialties, Inc.
3. Basco, Inc.
4. Bobrick Washroom Equipment, Inc.
5. General Accessory Manufacturing Co.
6. Miami-Carey.

2.2 MATERIALS, GENERAL:

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 0.034-inch (22-gage) minimum thickness.

B. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 0.04-inch (20-gage) minimum. Surface preparation and metal pretreatment as required for applied finish.

C. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

D. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

E. Mirror Glass: Nominal 6.0-mm (0.23-inch) thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating, and protective organic coating.

F. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

G. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.

[*]2.3 MULTIPURPOSE UNITS:

DELETED.

2.4 GRAB BARS:

A. Stainless Steel Type: Provide grab bars with wall thickness not less than 0.05 inch (18 gage) and as follows:

1. Mounting: Concealed, manufacturer's standard flanges and anchorages.
2. Clearance: 1-1/2-inch clearance between wall surface and inside face of bar.
3. Gripping Surfaces: Manufacturer's standard nonslip texture.
4. Medium-Duty Size: Outside diameter of 1-1/4 inches.

2.5 RESIDENTIAL BATH ACCESSORIES:

A. Single-Roll Toilet Tissue Dispenser: Size to accommodate core type tissue to 5-inch-diameter roll.

B. Shower Curtain Rod, Normal Duty: 1-inch o.d., 0.04-inch (20-gage) stainless steel, satin finish; furnish with 3-inch o.d., minimum 0.04-inch (20-gage) stainless steel flanges with satin finish, designed for concealed fasteners.

[*]C. Deleted.

[*]D. Towel Bar: [18- or] 24-inch-long as indicated, satin

finished, Type 304 stainless steel tubular (3/4-inch-square) bar and rectangular end brackets. Provide galvanized backplates for concealed mounting.

E. Double-Prong Robe Hook: Heavy-duty satin finished stainless steel double-prong robe hook; rectangular wall bracket with backplate for concealed mounting.

[*]F. Deleted.

[*]G. Standard Medicine Cabinet: Unit designed for semi-recessed mounting in nominal 3-inch wall depth consisting of hinged stainless steel framed mirror door concealing storage cabinet with minimum [two] adjustable [ ] shelves. Door equipped with full-length, piano hinge and spring-buffered, rod-type stop and magnetic door catch. Fabricate door, hinge and cabinet of enamel-finish steel, as specified under "Materials, General". Furnish in nominal **[16-by-24]** inch mirror size.

[*] 1. Acceptable Product: [ ]. **[Any Standard 16 inch by 22 inch unit complying with the above requirements.]**

[*]H. Deleted.

I. Frameless Mirror Units: Fabricate of mirror glass as specified under "Materials, General", with polished pencil edges. Furnish acrylic mounting clips and stainless steel fasteners.

2.6 FABRICATION:

A. General: No names or labels are permitted on exposed faces of toilet and bath accessory units. On either interior surface not exposed to view or on back surface, provide identification of each accessory item either by a printed, waterproof label or a stamped nameplate indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

D. Framed Mirror Units, General: Fabricate frames for glass mirror units to accommodate wood, felt, plastic, or other glass edge protection material. Provide mirror backing and support system that will permit rigid, tamperproof glass installation and prevent moisture accumulation, as follows:

E. Mirror Unit Hangers: Provide system for mounting mirror units that will permit rigid, tamperproof, and theftproof installation.

F. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

[*]2.7 PAPER TOWEL DISPENSERS:

[*]A. Provide unit fabricated of stainless steel with seamless 1-inch-wide wall flange, hinged front with tumbler lock and continuous piano hinge.

[*] 1. Capacity: 300 C-fold towels or 400 multifold towels, designed to dispense either type without special adapters.
[*] 2. Mounting: Semi-recess mounted in nominal 3-inch wall depth.

[*]B. Application: At non-residential toilet rooms.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Inspect wall surfaces receiving grab bars with Installer present to ensure that blocking is properly located and installed.

3.2 INSTALLATION:

A. Install toilet accessory units according to manufacturers' instructions, using fasteners appropriate to substrate as recommended by unit manufacturer. Install units plumb and level, firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in tamperproof manner with acrylic mounting clips. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.

C. Install grab bars to withstand a concentrated load of at least 250 lbs, complying with ASTM F 446.

3.3 ADJUSTING AND CLEANING:

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces strictly according to manufacturer's recommendations after removing temporary labels and protective coatings.

[*]3.4 SCHEDULE OF TOILET ACCESSORIES:

[*]A. The following schedule takes precedence over items shown on bathroom elevations.

[*]B. For each residential bathroom, provide the following toilet accessories:

[*] 1. Frameless Mirror, 36 inches high by width of vanity counter.
[*] 2. Medicine Cabinet: 22 inches by 16 inches nominal.
[*] 3. 1 two-prong robe hook.
[*] 4. Toilet paper holder.
[*] 5. Shower rod.
[*] 6. Two 24 inch towel bars.

[*]C. For each residential half bathroom (lavatory), provide the following toilet accessories:

[*] 1. Frameless Mirror, 36 inches high by width of vanity counter.
[*] 2. 1 two-prong robe hook.
[*] 3. Toilet paper holder.
[*] 4. One 18 inch and one 24 inch towel bar.

[*]D. For barrier-free unit baths and half bathrooms, furnish toilet accessories as indicated above and grab bars shown on drawings.

END OF SECTION 10800

SECTION 14210 - ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes the following electric traction elevators:

1. Passenger elevators.

B. Related Sections: The following sections contain requirements that relate to this Section:

1. Setting of sleeves, inserts, and anchoring devices in concrete are specified Section 03300, "Cast-in-Place Concrete".
2. Structural framing of hoistways, elevator rail supports, machine beams, and other structural framing is specified in Section 05120, "Structural Steel".
3. [*] [Installation and grouting of] Subsills of hoistway entrances and elevator pit ladders are specified in Section 05500, "Metal Fabrications."
4. Elevator shaft enclosures are specified in Section 09250, "Gypsum Drywall".
5. Ventilation of hoistway is specified in Section 10200, "Louvers".
6. [*] Electrical service to each elevator, including fused disconnect switch and emrgency/standby power service, [and conduit required outside of the hoistway], is specified in Section 16100, "Electrical".
7. Heat, smoke, or products of combustion sensing devices are specified in Section 16100, "Electrical".

1.3 DEFINITIONS:

A. Electric traction elevators are hereby defined to include elevators in which cars are hoisted by ropes over power-driven traction sheaves, complete with components, equipment, machines, controls, and devices as indicated and as required for safely operating elevators at rated speed and capacity.

1.4 SYSTEM PERFORMANCE REQUIREMENTS:

A. Elevator schedules indicate required performances, controls, capacities, features, and finishes for each group of elevators and are included at end of this Section.

1.5 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product Data for each elevator unit, indicating capacities, sizes, performances, operations, safety features, controls, finishes, and similar information. Indicate any variations from specified requirements.

C. Shop Drawings including dimensioned drawings for each elevator, showing plans, elevations, sections and large-scale details indicating service at each landing, coordination with building structure and relationships with other construction. Indicate any variations from specified requirements plus maximum dynamic and static loads imposed on building structure at points of support. Indicate access and ventilation for elevator machinery rooms and hoistways, and locations and details of items furnished under this Section for installation in the work of other sections.

D. Wiring diagrams detailing locations and wiring for power, signal and control systems and differentiating clearly between manufacturer-installed wiring and field-installed wiring. Indicate maximum and average power demands.

E. Samples of exposed finishes for car, hoistway doors, and signal equipment, 8-inch to 10-inch square samples of sheet materials, and 10-inch to 12-inch lengths of running trim members.

F. Maintenance Manuals: Bound manuals for each different type electric traction elevator. Include operating and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information.

1.6 QUALITY ASSURANCE:

A. Installer Qualifications: Engage the elevator manufacturer or an installer approved by the elevator manufacturer and who has completed elevator installations similar in material, design, and extent to that indicated for Project which have resulted in installations with a record of successful in-service performance.

B. Regulatory Requirements:

1. Comply with ASME/ANSI A17.1, "Safety Code for Elevators and Escalators," hereafter referred to as the "Code."
2. Comply with Massachusetts Elevator and Escalator Regulations, 524 CMR 2.00 through 11.00 and 524 CMR 15.00 through 34.0, and with the Massachusetts State Building Code Paragraph 602, the "Highrise Code".
3. Comply with the accessiblity requirements indicated in 521 CMR.

1.7 WARRANTY:

A. Special Project Warranty: Provide special project warranty, signed by Contractor, Installer, and Manufacturer, agreeing to replace, repair, or restore defective materials and workmanship of elevator work during warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.

1. "Defective" is hereby defined to include, but not by way of limitation, operation or control system failures, performances below specified ratings, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected, and unsatisfactory conditions.
2. Warranty period is 12 months starting on date of Substantial Completion.

1.8 MAINTENANCE SERVICE:

A. Initial Maintenance Service: Provide full maintenance service by skilled, competent employees of the elevator Installer for period of 12 months following date of Substantial Completion. Include monthly preventive maintenance, performed during normal working hours. Include repair or replacement of worn or defective parts or components and lubrication, cleaning, and adjusting as required for proper elevator operation in conformance with specified requirements. Include 24-hours-per-day, 7-days-per-week emergency callback service. Exclude only repair or replacement due to misuse, abuse, accidents, or neglect caused by persons other than Installer's personnel.

B. Continuing Maintenance Service: Installer shall provide a continuing maintenance proposal to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date construction contract maintenance requirements are concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include but are not limited to the following:

1. Dover Elevator Corp.
2. Montgomery Elevator, Inc.
3. Otis Elevator Co.
4. Schindler Elevator Corp.
5. U.S. Elevator/Cubic Corp.

2.2 MATERIALS AND COMPONENTS:

A. General: Provide manufacturer's standard pre-engineered elevator systems that comply with or fulfill the requirements of elevator schedule sheets at end of this Section, or, at manufacturer's option, provide custom-manufactured elevator systems that will fulfill requirements. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard pre-engineered elevator systems and as required for a complete system.

   1. The drawings are based on Dover Elevators Model SPF 25/35 and SPF 21/35. Minor variations in specified components to conform to another manufacturer's pre-engineered system will be accepted if, in the opinion of the Architect, they are substantially equal to that specified.

B. Elevator Machines and Equipment: Except as otherwise indicated, provide manufacturer's standard variable-voltage traction-type hoisting machines. Provide geared-type machines.

   1. At manufacturer's option, provide variable-frequency a.c.-type hoisting machine in lieu of variable-voltage type.

C. Power Control: Except as otherwise indicated, where variable voltage is required, provide manufacturer's standard solid-state power converters for use with manufacturer's motors on elevator machines (a.c. or d.c.).

   1. Provide line filters or chokes to prevent electrical

peaks or spikes from feeding back into building power system from solid-state converters.

D. Inserts: Furnish required concrete inserts and similar anchorage devices for the installation of guide rails, machinery, and other components of elevator work where installation of devices is indicated as work of another specification section.

E. Guide Shoes/Rollers: Except as otherwise indicated, provide manufacturer's standard units: rollers for speeds in excess of 200 fpm.

F. Car Frame and Platform: Manufacturer's standard welded steel units.

2.3 CONTROL SYSTEMS:

A. General: Provide manufacturer's standard control system for group of elevators as required to provide group automatic operation of the type indicated and defined in the Code as "Operations."

1. 2-Car Group Control - Passenger: Provide solid-state "Group Automatic Operation" as defined in ASME/ANSI A17.1:

[*] a. "Traflomatic [IV]" by Dover Elevator Corp.

B. Auxiliary Operations/Controls: In addition to primary control system features, provide the following controls or operational features for passenger elevators, except where otherwise indicated:

1. Emergency/standby power operation.
2. Automatic 2-way leveling.
3. Distributed parking of cars during off-peak hours.

C. Emergency Service: Provide manufacturer's standard emergency service operations to meet requirements of referenced codes, including the following equipment:

1. Reduced voltage starters.
2. Firefighter's key switch operation.
3. Rough-in for firefighter's telephone.
[*] 4. Car position/status indicators for location in Fire Control Center [which will indicate floor location and operational status of each elevator].

2.4 SIGNAL EQUIPMENT:

A. General: Provide signal equipment for each elevator or group of elevators to comply with requirements indicated below.

1. Provide illuminated hall-call and car-call buttons that light up when activated and remain lighted until call or other function has been fulfilled; fabricate of acrylic or other permanent translucent plastic.
2. Except for buttons and illuminated signal elements, fabricate signal equipment with exposed surfaces of stainless steel with manufacturer's standard directional polish or satin finish.
3. Car Control Stations: Provide car control station in each car with flush-mounted metal faceplates, containing call button for each landing served and other buttons, switches, and controls required for specified car operation and control. Mount at height complying with ASME/ANSI A117.1. Provide operating device symbols as required by Code. Mark other buttons and switches with manufacturer's standard identification for required use or function.
4. Car Position Indicator: For cars, provide either illuminated-signal type or digital-display type, located near top of each car or in car control station. Include direction-of-next-travel signal if not provided in car control station.

   a. In addition to visual indicator, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.

5. Hall Push-Button Station: Provide hall push-button station at each landing for group of elevators.

   a. Locate station between 2 elevators or at location most convenient for approaching passengers. Provide unit with flat faceplate designed for flush-mounting on wall with body of unit recessed in wall.
   b. Provide 2-button station where passengers can travel either direction; 1-button station where only one direction of travel is available and indicate which direction that is.

6. Hall Lanterns: Provide units with illuminated "up" and "down" signal arrows, but provide single arrow where only one direction is possible. Provide units projecting from faceplate for ease of angular viewing, except provide flush units where a location in hoistway entrance frame is indicated. Match materials, finishes, and mounting method of hall push-button stations.

   a. In conjunction with each hall lantern device, provide an audible signal to indicate that a car is arriving in response to a hall call and to indicate direction of car travel. Signal shall sound once for up direction of travel and twice for down direction. At manufacturer's option, audible signal may be placed on each car.

[*] 7. Hall Position Indicator: Provide illuminated-signal type or digital-display type, located above [main] hoistway entrance [ ]. Match materials, finishes, and mounting method of hall push-button stations.

   a. At manufacturer's option, lantern signals may be integrated with hall position indicators.

[*] 8. Telephone: Provide rough-in for [firefighter] telephone hand set in each car, contained in flush-mounted cabinet and complete with identification and instructions for use.

[*] [9. Communication System: Provide rough-in and finish devices for two-way communicator at each elevator cab and elevator console in Fire Command Room.]

2.5 PASSENGER ELEVATOR CAR ENCLOSURES:

A. General: Provide manufacturer's standard cost-reduced pre-engineered car enclosures as indicated. Include ventilation, lighting, ceiling finish, wall finish, access doors, doors, power door operators, sill (threshold), trim, accessories, and floor finish. Provide horizontal sliding doors of manufacturer's standard flush panel type, with operation and number of panels as indicated. Provide manufacturer's standard protective edge trim system for door and wall panels, except as otherwise indicated.

1. Materials and Fabrication: Provide selections as indicated for each car enclosure surface; provide manufacturer's standards, based on the following:

   a. Enameled Steel Panels: Flush hollow-metal construction, fabricated from ASTM A 366 cold-rolled steel, commercial quality, Class 1, matte finish, stretcher leveled. Provide with factory-applied baked-on enamel finish; colors as selected by Architect.
   b. Stainless Steel: AISI type 302/304, with No. 4 satin finish.
   c. Aluminum Sills: Cast or extruded aluminum, with grooved surface, 1/4-inch thickness, mill finish.
   d. Plastic Laminate: High-pressure type complying with NEMA LD3, Type GP-50 (0.05-inch nominal thickness); color, texture and pattern as selected by Architect from standard products available in the industry.

e. Fabricate car door frame integrally with front wall of car.
f. Fabricate car with recesses and cutouts for signal equipment.
g. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent or open egg-crate plastic, of acrylic or other permanent rigid plastic complying with flammability requirements.
h. Carpeting: ASTM 84, Class B, color and pattern as selected by Architect from manufacturer's standard range.
i. Certificate Cover: Provide local code inspection certificate cover in each car, clear acrylic in stainless steel frame.

2.6 PERSONAL PROTECTIVE DEVICES:

A. Handrails: Provide manufacturer's standard stainless steel handrails on side walls and back wall unless otherwise indicated; either continuous or segmented units.

B. Door Edge Protective Device: Provide retractable edge shoe on leading edges of elevator entrance doors that causes doors to stop and reopen upon contacting an obstruction in entrance.

C. Photo-Eye Detection Device: Provide electronic photo-eye device with timed cutout, projecting dual light beams across car entrance at 5-inch and 29-inch heights, that when interrupted will cause closing doors to stop and reopen. Provide keyed switch in car operating panel or toggle switch in service cabinet for disconnecting photo-eye protective device.

1. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time period, through activation of detection device or door edge protective device, a loud buzzer shall sound and doors shall begin to close at reduced rate of speed. Doors shall continue to close unless door edge protective device is activated, which shall cause doors to reopen. Process shall repeat continuously until obstruction is removed from entrance.

2.7 PASSENGER HOISTWAY ENTRANCES:

A. General: Provide manufacturer's standard, pre-engineered, hollow metal type, sliding, door-and-frame hoistway entrances complete with track systems, hardware, safeties, sills, and accessories. Match car enclosure doors for size, number of door panels, and door panel movement. Provide frame-section size and profile to coordinate with hoistway wall construction as indicated.

1. Where gypsum-board type wall construction is indicated, fabricate frames with reinforced head sections; provide sufficient strength without support from wall lintels.

B. Materials and Fabrication: Provide selections indicated; manufacturer's standards, but not less than the following:

1. Enameled Frames: Formed steel with manufacturer's standard baked synthetic enamel finish, colors as selected by Architect.
2. Enameled Steel Panels: Flush hollow-metal construction, fabricated from ASTM A 366 cold-rolled steel, commercial quality, Class 1, matte finish, stretcher leveled. Provide with factory-applied baked-on enamel finish; colors as selected by Architect.
3. Aluminum Sills: Extruded aluminum, with grooved surface, 1/4-inch thickness, mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Prior to commencing elevator installation, examine hoistways, hoistway openings, pits, and machine rooms, as constructed; verify all critical dimensions; and examine supporting structure and all other conditions under which elevator work is to be installed. Notify Contractor in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 INSTALLATION OF ELEVATOR SYSTEM:

A. General: Comply with manufacturer's instructions and recommendations for work required during installation.

B. Welded Construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.

C. Coordination: Coordinate elevator work with work of other trades for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by Contractor to ensure dimensional coordination of the work.

D. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure and thereby, eliminate sources of structure-borne noise from elevator system.

E. Lubricate operating parts of systems, including ropes, as recommended by manufacturers.

F. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

G. Leveling Tolerance: 1/4-inch, up or down, regardless of load and direction of travel.

[*]H. Set sills flush with finished floor surface at landings. [ ].

3.3 FIELD QUALITY CONTROL:

A. Acceptance Testing: Upon nominal completion of each elevator installation and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code and governing regulations or agencies.

B. Advise Contractor, Owner, Architect, and Inspection Department of governing agencies in advance of dates and times tests are to be performed on elevators.

3.4 PROTECTION:

[*]A. At time of Substantial Completion of elevator work (or portion thereof), provide suitable protective coverings, [ ] to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

B. Provide similar protective measures for elevator units that will be placed in temporary service, including inspection and maintenance service during period of temporary service.

[*] [1. Temporary service, if requested by General Contractor, shall be subject to acceptance of elevator installer's temporary service agreement and conditions indicated in Section 01500, "Temporary Facilities".]

3.5 DEMONSTRATION:

A. Instruct Owner's personnel in proper use, operation, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.

B. Make a final check of each elevator operation with Owner's personnel present and just prior to date of Substantial Completion. Determine that control systems and operating devices are functioning properly.

3.6 ELEVATOR SCHEDULE:

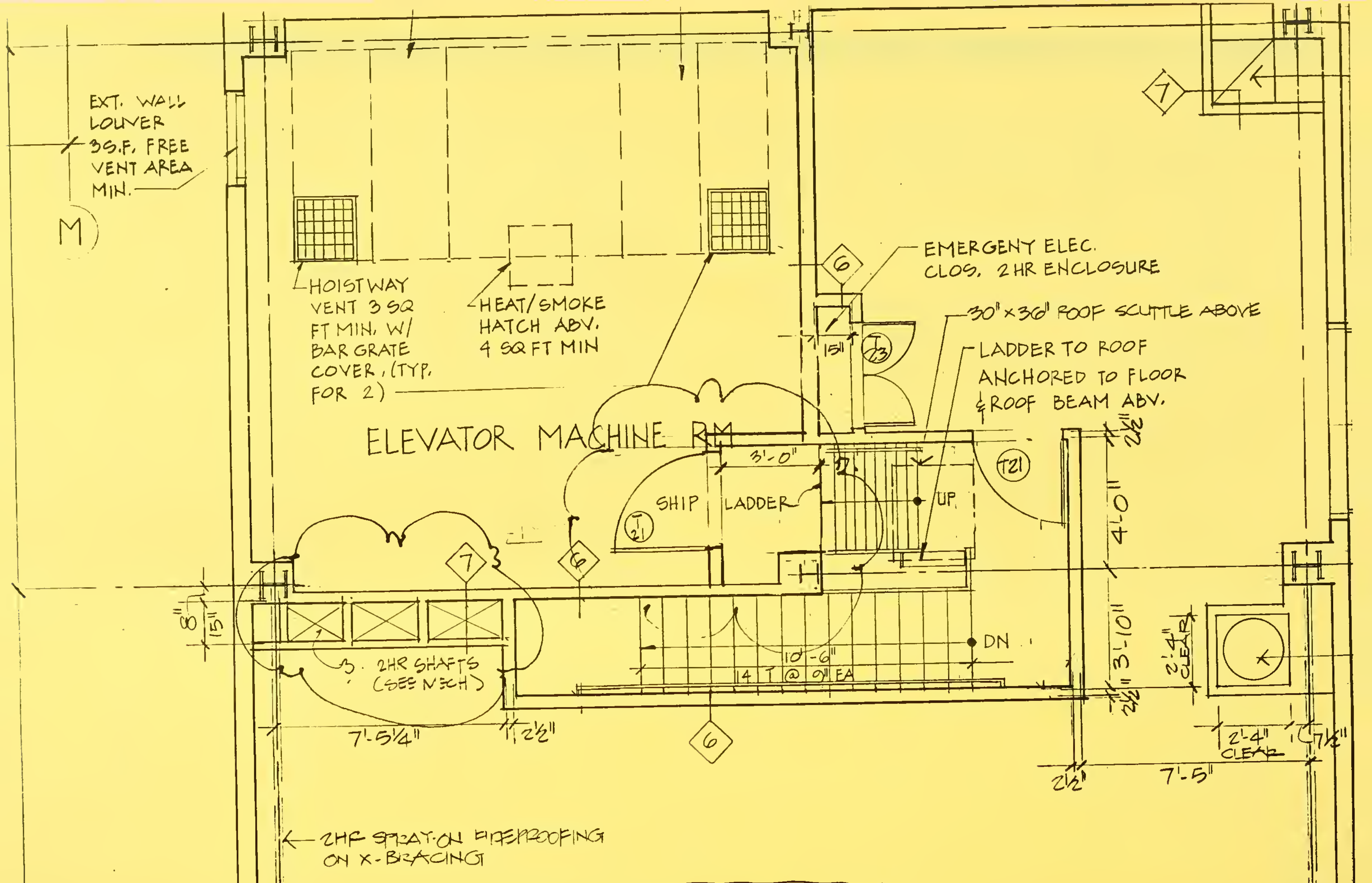
A. Furnish elevators complying with the following minimum requirements:

1. Elevator: Nos. 1 and 2 Grouped
2. Rated Load: Elev. No. 1: 2500 lbs
   Elev. No. 2: 2100 lbs
3. Rated Speed: 350 fpm
4. Travel Distance: 96'-3"
5. Stops: 11 (All Floors plus Basement)
6. Power Supplied: 208 V, 3 Ph, 60 Hz.
7. Control System: Group Control with Microprocessor
8. Auxiliary Operations: Emergency Power Operation; Automatic Standby Operation
9. Car Enclosures: Elev. No. 1: 6'-8" wide x 4'-3" deep, inside; Elev. No. 2: 5'-8" wide x 4'-3" deep, inside.

[*] 10. Car Finishes: Front Wall: Stainless Steel; Other Walls: Plastic Laminate; Door Faces: Factory-enameled Steel; Floor: Carpet; Ceiling: Disc lighted [with stainless steel panels].

11. Hoist Entrance: Elev. No. 1: 3'-6" x 7'-0", side opening; Elev. No. 2: 3'-0" x 7'-0", side opening. Finish: Enameled Steel frames and Doors.

END OF SECTION 14210


EXT. WALL LOUVER 3S.F. FREE VENT AREA MIN.
M
HOISTWAY VENT 3 SQ FT MIN. W/ BAR GRATE COVER, (TYP. FOR 2)
HEAT/SMOKE HATCH ABV. 4 SQ FT MIN
EMERGENY ELEC. CLOS. 2HR ENCLOSURE
30"×36" ROOF SCUTTLE ABOVE
LADDER TO ROOF ANCHORED TO FLOOR & ROOF BEAM ABV.
ELEVATOR MACHINE RM
SHIP LADDER
3'-0"
15"
T23
T21
T21
UP
DN
7
6
6
6
7
8"
15"
3. 2HR SHAFTS (SEE MECH)
10'-6"
14 T @ 9" EA
7'-5¼"
2½"
4'-0"
3'-10"
2½"
2½"
2'-4" CLEAR
2'-4" CLEAR
7½"
2½"
7'-5"
2HR SPRAY-ON FIREPROOFING ON X-BRACING
2HR SPRAY-ON FIREPROOFING ON X-BRACING

ADDENDUM #1

SKETCH #1

DOOR SCHEDULE

UNIT DOORS

NO.	MATER.	WIDTH	HEIGHT	THICK.	DOOR TYPE / FRAME TYPE	HEAD	JAMB	HARDW	LABEL	REMARKS
A	INS ST	36"	80"	1-3/4"	A/F1	SIM 10/A8.3	7/A2.12	9		SCREEN DOOR
B	INS.ST	36"	80"	1-3/4"	A/F1	4	7/A2.12	10		SCREEN DOOR
C	INS.ST	36"	80"	1-3/4"	A/D	2	1, 3	23	C	
D	INS. ST	32"	80"	1-3/4"	A/D	"	"	19	B	
E	HST	36"	80"	1-3/4"	A/D	"	"	23	C	
F	HC.WD	32"	80"	1-3/8"	A/D	"	"	24	-	
G	SC.WD	36"	80"	1-3/8"	A/D	"	"	24	-	
H	HC.WD	28"	80"	1-3/8"	A/D	"	"	25	-	
J	HC.WD	36"	80"	1-3/8"	A/D	"	"	25		
K	STL	30"×2	80"							PAIR BIFOLD
L	STL	27"×2	80"							PAIR BIFOLD
M	STL	24"×2	80"							PAIR BIFOLD
N	STL	36"	80"							BIFOLD
O	STL	24"	80"							BIFOLD
P	STL	18"	80"							BIFOLD
Q	HC.WD	36"×2	80"	1-3/8"	A/D	2	1, 3	27		PAIR
R	HC.WD	30"×2	80"	1-3/8"	A/D	"	"	27		PAIR
S	HC.WD	24"×2	80"	1-3/8"	A/D	"	"	27		PAIR
T	HC.WD	18"	80"	1-3/8"	A/D	"	"	26		
U	STL	30"	80"							BI FOLD
V	HC WD	30'	80'	1-3/8"	A/D	2	1,3	26		

LOW RISE

NO.	MATER.	WIDTH	HEIGHT	THICK.	DOOR TYPE	FRAME TYPE	HEAD	JAMB	HARDW.	LABEL
L1	INS. ST.	36	80	1 3/4"	C	H	7	5, 6	5	
L2	INS. ST.	36	80	1 3/4"	C	G	4	4	8	
L3	INS. ST.	36	80	1 3/4"	B	F	4	4	8	
L4	INS. ST.	2×36	80	1 3/4"	A	F	4	4	11	

TOWER

NO.	FROM / TO	WIDTH	HEIGHT	MATER.	DOOR TYPE	FRAME TYPE	HEAD	JAMB	HARDW.	LABEL	
T1	STAIR T1	32	80	STL	B	D	2	1,3	18	B	
T2	STAIR T1	32	80	STL	B	D	2	1,3	18	(C)	
T3	STAIR T2	32	80	STL	B	D	2	1,3	18	B	
T4	TRASH RM	36	80	STL	B	D	2	1, 3	22	C	
T5	ELEC.CL.	2×28	80	STL	A	D	2	1,3	21	C	
T6	103, 104, 112, 115 / EXT	36	80	INS.STL	C	F2	4	4	6		
T7	101 / EXT			INS.STL	BB	BB	SEE 10/A8.3		1		SEE A8.3
T8	STAIR / EXT	36	80	INS.STL	A	C	"		7		
T9	106 / EXT	2×36	80	INS.STL	A	C	"		11		
T10	107 / 101	2×36	80	STL	C	A	2	1, 3	2		
T11	107 / 108	32	80	STL	A	D	2	1, 3	17		
T12	116 / 107	28	80	STL	A	D	2	1, 3	15		
T13	111, 109 / 107	36	80	STL	D	E	2	1, 3	12	C	
T14	109 / 110	36	80	STL	A	D	2	1, 3	13		
T15	112 / 111	2×36	80	STL	C	D	2	1, 3	16		
T16	107 / 102	36	80	STL	D	D	2	1, 3	4	C	
T17	102 / EXT	36	80	INS. STL	AA	AA	SEE 10/A8.3		3		
T18	STAIR T2 / EXT	36	80	INS. STL	B	B	4	4	7		
T19	113 / 114	36	80	STL	A	D	2	1, 3	14		
T20	113 / 111	36	80	STL	C	D	2	1, 3	13		
T21	MECH.	32	80	STL	A	D	2	1, 3	20	B	
T22	ROOF	2×36	80	INS.STL	A	D	8	8	11		
T23	ELEC.CL.	2×18	80	STL	A	D	2	1, 3	21	B	
T24	LAUNDRY	36	80	STL	C	D	2	1, 3	22	C	

ADDENDUM # 1 - SKETCH # 2

1 October 1992

ADDENDUM NUMBER TWO

This Addendum adds to, deletes from, clarifies, or alters the original Contract Document package prepared by Lawrence K. Cheng Associates, Inc. dated 4 September 1992 and amended 25 September 1992, as follows:

I. BID DOCUMENTS:

A. Bid Proposal Form:

1. Clarification: Only a single copy of Bid Bond is due at bid date. Requirement to submit in triplicate as indicated in Invitation applies to Bid Proposal Form only.
2. Attachment No. 5, "Schedule of Unit Prices" (Page 10 of Bid Form) has been revised and reissued to include one additional Unit Price. A copy is enclosed as part of this Addendum. 1 sheet.

II. TECHNICAL SPECIFICATIONS:

A. Section 01025, "Unit Prices":

Add the following paragraph to the Schedule of Unit Prices:

"E. Item No. 5 - General Conditions Time:

1. Description: Provide General Conditions as required during time that the work may be stopped to permit intermediate and final classification testing of contaminated materials by the Owner as indicated in Section 02220. Do not include potential liquidated damages in the unit; Contract time will be extended by whatever time delay is incurred.
2. Unit of Measurement: Week of delay required."

B. Section 02220, "Handling and Disposing of Contaminated Materials":

Clarification: The Contractor shall bid the project assuming no excavated materials require intermediate or final classification; that initial classifiaction testing will be performed by the Owner during excavation; and that initial classification testing will not delay the Contractor's operations. No down time for handling contaminated materials should be included in Base Bid.

C. Section 08710, "Door Hardware":

Finishes for door closers only may be sprayed-on aluminum in lieu of stainless steel.

D. Section 15600, "HVAC":

Delete 2.11 B. d. and replace with the following: "Provide unit with built-in two-speed switch and remotely located thermostat."

E. Section 16000, "Electrical":

1. Section 2.37:

   a. Omit the first two sentences of the second paragraph of 1. GENERAL and replace with the following: "The electrical contractor shall provide a lightning protection system for the Tower roof and the Mechanical Penthouse roof only. Include a detailed layout of the lightning protection system with the shop drawing submittal."
   b. Delete paragraph 14 in its entirety.

III. DRAWINGS:

A. Site/Civil Drawings:

1. C2:
   a. Add the following note: "Remove all discontinued utilities from site."
   b. Gas Service: Assume new gas service from Oak Street main.
   c. Provide trenching, backfill, concrete fill, and street repair as required for electrical connections to the underground transformer vault from the nearest electric manhole for conduit installed by the Boston Edison Co.
   d. Provide trenching, backfill, and concrete fill for eight 4 inch and one 3 inch conduits installed by Electrical Subcontractor from the main electrical room to the underground transformer vault.
   e. Provide trenching, backfill, and concrete fill for two 3 inch conduits installed by Electrical Subcontractor from the main electrical room to the emergency generator.
   f. All underground electrical and telephone conduit shall be encased in 8 inch concrete cover throughout. All plumbing pipe, sewer pipe, and gas pipe shall be encased in 8 inch

concrete at penetrations through or under concrete grade beams to 4 feet of either side.

B. **Architectural Drawings:**

1. Typical for A5.1 through A5.5: Where gypsum board ceilings are suspended from joists, alternate details are indicated (wire suspended cold formed channels and runners, or stud framing). Where fire ratings are required, provide fire-rated suspended assembly complying with UL Design G523 (which requires wire suspended channels and runners), unless building officials accept alternate suspension system complying with fire rating indicated.

C. **Plumbing and Fire Protection Drawings:**

1. P-2: Relocate gas meter and service entry to location indicated on C2. Route 4 inch gas service under slab from meter location to tower basement.
2. P-9: Provide 2HP, 208V, 3 Phase, 60 cycle gas booster pump at Fire Pump Room.

D. Electrical Drawings:

1. E6: Add one fire alarm pull station adjacent to main exit door.
2. E7:
    a. Add a fire alarm pull station adjacent to each of the two stairwell doors.
    b. Add a 15A/1P homerun from the living room receptacle circuit of the upper left unit.
3. E8 through E10: Add a fire alarm pull station adjacent to each of the two stairwell doors.
4. E11 and E15: Add a note as follows: "Refer to E-19 for security system one-line diagram, typical for all first floor lowrise units".
5. E15: Add a 15A/1P washing machine circuit and a 30A/2P dryer circuit to each rowhouse unit; locate outlets in third floor laundry closet.
6. E16:
    a. At the telephone riser diagram, replace all references to "4/c #22 station wire" with "3/4-inch E.M.T. w/ pullcord".
    b. Replace the note at the Oak Street first floor reading "3/4-inch x 2' x 2' plywood tel. bkbd. located in Trash Room" with the following: "See note #2; refer to Dwg. E-1 for location of adjacent meterbank."
    c. Add the following note: "3. E.C. shall provide all cable and devices within the units as indicated in the specifications. N.E. Tel. Co. to provide cable to the first device within the unit."

7. E17: At the first floor of the fire alarm riser diagram, change the tag on the pull station to read "Typ. for 9".
8. E19:
   a. Add the wiring of an electric door release to all intercom systems.
   b. Add the following note to the TYPICAL LOW RISE INTERCOM SYSTEM DIAGRAM: "Diagram indicated is typical for Stairs #1, 7, 8, and 14. Stairs #3 and 10 are similar with the exception of requiring one additional unit. Stairs #5 and 12 are similar with the exception of requiring two additional units."
   c. Add the following note to the security system riser diagram: "3. E.C. shall provide a 2/c #22 cable from each security system control panel to a 6 inch x 6 inch x 6 inch weatherproof, lockable pull box provided adjacent to the building's respective meterbank (provision for future central connection)."

END OF ADDENDUM NUMBER TWO.

ATTACHMENT NUMBER 5

SCHEDULE OF UNIT PRICES

In accordance with the terms and conditions of the Contract and as part of the base proposal, the undersigned agrees to the following unit prices for designated work as described in Section 01025 which shall be considered as payment forms and not for purpose of determining contract award.

It shall be noted that work deducted from the basic contract covered by these stated unit prices will be DEDUCTED at the stated value LESS 15 percent.

[*] **Unit #1A - Excavation, handling, and disposal of material classified as Hazardous Waste out-of-state incorporating all ancillary costs as specified in Section 02220 . . . . $________/ton**

[*] **Unit #1B - Excavation, handling, and disposal of material classified as hazardous material at a DEP Class A recycling center, incorporating all ancillary costs as specified in Section 02220 . . . . $________/ton**

[*] **Unit #1C - Excavation, handling, and disposal classified as Regulated Soil at a DEP approved Sanitary Land Fill Site located within the Commonwealth of Massachusetts, incorporating all ancillary costs as specified in Section 02220 . . . . $________/ton**

Unit #2 - Purchase, deliver, place, and compact acceptable borrowed fill as specified in Section 02200 to replace removed contaminated soil . . . . $________/cu.yd.

Unit #3 - Furnish and install reinforced precast piles as specified in Section 02350 . . . . $________/ln.ft.
[*] (16,000 linear feet included in Base Bid.)

Unit #4 - Preaugering as required for reinforced precast piles as specified in Section 02350 . . . . $________/ln.ft.

(**) Unit #5 - General Conditions time as required during delays caused by soil testing requirements of Section 02220 . . . $_______/week

Bidders Initials:_____

5 April 1993

ADDENDUM NUMBER THREE

This Addendum adds to, deletes from, clarifies, or alters the original Contract Document package prepared by Lawrence K. Cheng Associates, Inc. dated 4 September 1992 and amended through 1 October 1992, as follows:

I. PROJECT MANUAL:

Project Manual Cover:

A. Environmental Design Engineers, Inc. has relocated. Revise address on cover as follows:

Environmental Design Engineers, Inc.
4 Militia Drive
Lexington, MA 02173
(617) 861-8883; fax (617) 863-6287

B. The Geotechnical Engineer of record has changed. Delete name and address on cover and substitute the following:

Haley & Aldrich, Inc.
58 Charles Street
Cambridge, MA 02141
(617) 494-1606

II. TECHNICAL SPECIFICATIONS:

A. Section 02200, "Earthwork":

Reference new underslab drainage and recharge system work in the scope of this Section.

1. Insert the following after Paragraph 1.2 B. 8.:

"9. Section 02710, "Underslab Drainage Systems", for underslab drainage work installed at subgrades and backfilled with drainage fill by this Section."

2. Insert the following after Paragraph 2.1 E.:

"F. Drainage Fill for Underslab Drainage and Recharge System: Evenly graded mixture of natural or crushed gravel or crushed stone and natural sand with 100 percent passing a

3/4-inch sieve and 0 to 2 percent passing a number 40 sieve, complying with M.H.D. M2.01.6.

"G. Filtration Fabric: Manufacturer's standard nonwoven geotextile fabric of polyester or polypropylene fibers, or a combination of them."

3. Insert the following as Paragraph 3.7 H. 1.:

"1. Comply with installation and backfill procedures indicated for underslab drainage systems."

B. **Section 02350, "Pile Foundations":**

This Section is DELETED entirely and replaced with a new Section 02350, "Caissons".

C. **Section 02350, "Caissons":**

Insert this new Section in place of Section 02350. A copy is attached as part of this Addendum.

D. **Section 02700, "Sanitary and Storm Sewerage Systems":**

Add new recharge system work in the scope of this Section.

1. Insert the following after Paragraph 2.2 D.:

"E. Drainage Pipe for Recharge System: Perforated polyvinyl chloride pipe, ASTM D 2729.

"1. Provide end caps, fittings, gaskets, and other accessories as required to complete indicated recharge system."

E. **Section 02710, "Underslab Drainage Systems":**

Insert this new Section as part of this Addendum. Total three pages.

F. **Section 04200, "Unit Masonry":**

Subparagraph 2.6 B. 1.: Substitute "3 oz." for "7 oz."

G. **Section 05500, "Metal Fabrications":**

Article 2.13: Substitute pre-fabricated stair system with pre-cast or premolded stair treads for field assembled units indicated.

H. **Section 07120, "Fluid-Applied Waterproofing":**

Insert this new Section in place of Section 07160. A copy is attached as part of this Addendum. Total 3 pages.

I. **Section 07160, "Bituminous Dampproofing":**

This Section is DELETED entirely and replaced with a new Section 07120, "Fluid-Applied Waterproofing".

J. **Section 07241, "Exterior Insulation and Finish Systems":**

This Section is revised to include independent testing and inspection services engaged by the Owner. Coordinate with testing agency as indicated elsewhere in the Contract Documents.

1. Insert the following after 1.5 E.:

"F. Additional Testing and Inspection: The Owner shall employ and pay for a qualified independent testing laboratory to perform additional tests at the application site as follows:

"1. Approximately one cut sample per 1000 square feet of installed base coat will be tested for proper coat thickness, coverage and mesh application prior to application of finish coat."

2. Insert the following after 3.5 B.:

"C. Test cuts will be taken by an independent testing laboratory paid by the Owner as indicated in Quality Assurance article to verify coat thickness and mesh placement. Repair test cuts prior to application of finish coat as follows:

"1. Apply standard mesh within test cut and apply detail mesh lapped 2-1/2 inches onto surrounding base coat. Embed mesh so that no mesh pattern is visible and feather out base coat a minimum of 12 inches."

K. **Section 07700, "Roof Specialties and Accessories":**

Delete all references to plastic skylight units from this Section; no skylight units are included in the work.

L. **Section 07710, "Fascia and Coping Assemblies":**

1. Article 2.2 and Article 2.3: Substitute shop-fabricated assemblies of .050" aluminum for pre-fabricated manufactured items. Fabricate items to profiles indicated and furnish water dams, cleats, hold-down clips, and other accessories as shown.

2. Article 2.5: Delete entirely and substitute the following:

   "A. Baked Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: Thermosetting modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with minimum dry film thickness of 1.5 mils.) Color as selected by Architect from manufacturer's standard colors."

M. **Section 07900, "Joint Sealants":**

This Section is revised and reissued to change the sealant installed at the EIFS to a low modulus silicone sealant, and to include additional inspection services paid for by the Owner. A copy is attached as part of this Addendum.

N. **Section 09680, "Carpet":**

The carpet and padding specifications are revised to include the following products, **subject to MHFA review and approval:**

1. Add the following after 2.2 A.:

   "B. Acceptable Product: Notwithstanding the above requirements, "Foundation FHA", Simco Corp."

2. Add the following after 2.4 C.:

   "D. Acceptable Products: Notwithstanding the above requirements:

      "1. Type I Carpet: "Blockbuster 24", Wimbledon Carpet Mills.
      "2. Type II Carpet: "Blockbuster 26", Wimbledon Carpet Mills."

O. **Section 09900, "Painting":**

Subparagraph 3.7 C. 2.: Substitute "2" for "3" at first sentence; delete 3.7 C. 2. c. entirely. Kitchens and baths shall receive only two coats of paint.

P. **Finish Schedule:**

The Finish Schedule is revised and reissued to change floor/base finishes at egress stairs and Unit Kitchens and Baths, and to add missing tower basement spaces.

Q. **Section 15400, "Plumbing":**

1. Article 2.05:

   a. A.: Add "or Schedule 40 PVC." after "hubless" at end of first and second subparagraphs.
   b. G.: Change the following text:
      (1) Change "2-1/2 inches and larger" at third subparagraph to "4 inches and larger".
      (2) Change "2 inches and smaller" at fourth subparagraph to "3 inches and smaller".

2. Article 2.15:

   a. P-2: Delete "Moen #8935" and substitute "Gerber #43-431".
   b. P-3: Delete "American Standard" entirely; delete "fiberglass" and substitute "acrylic".
   c. P-3A: Delete "American Standard" and substitute "Aquarius No. 2766 or 2767 right or left hand"; delete "fiberglass" and substitute "acrylic".
   d. P-4: Delete "Moen Model #2522" and substitute "Elkay PSR-2522"; delete "Moen #8722" and substitute "Gerber #42-253; insert "r" at the end of the word "Badge".
   e. P-4A: Delete "/" after "connector" and substitute "with"; insert "r" at the end of the word "Badge".
   f. P-4B: Delete "Moen Model #E-3322" and substitute "Elkay PSR-3322".

R. **Section 15500, "Fire Protection":**

At Article 2.12 A., substitute "1500 GPM" for "1000 GPM"; at C. substitute "125 HP" for "75 HP".

S. **Section 15600, "HVAC":**

Article 2.19 I.:

1. Change the title of the paragraph from "Smoke Vestibule" to "Stair Vestibule/Smoke Exhaust Ventilation".

2. Delete subparagraph a. and replace with the following:

   "a. Vestibule supply air fans shall start upon activation of a sprinkler water flow switch or smoke detector. Furnish and install an override starting device to allow testing of system on a periodic basis. The flow switches shall be furnished and installed by the mechanical contractor and wired by the electrical contractor. The electrical contractor shall furnish and install the smoke detectors and wire all."

T. Section 16000, "Electrical":

1. Article 2.10 C.: Omit the third sentence and replace with the following: "Bus bars shall be electro-tin plated aluminum and shall be supported every 10 inches within the casing with non-tracking insulators."

2. Article 2.26 B.: Omit paragraph and replace with the following: "Electrical contractor shall furnish and install conduit, wire, compression connectors from the secondary connections at the transformer to the limiter lug cabinet, and from the limiter lug cabinet to the main switchboard. Sizes of which shall be indicated on drawings."

3. Article 2.32 :

   a. A.: Add the following sentence to each of paragraphs 2.32 A. 3. k, l, m: "(Operation to occur upon activation of any alarm device within the 10 story tower, with the exception of manual pull stations.)"
   b. B. 25. a: Omit the first sentence and replace with the following: "Each handicapped unit shall be provided with single station photoelectric smoke detector, Gentex Model 710CS, located as indicated on the plans. Each non-handicapped unit shall be provided with single station photoelectric smoke detector, Gentex Model 7100F, located as indicated on the plans."

III. DRAWINGS:

Refer to drawings for changes. All changes have been bubbled or the drawings have been re-issued, as appropiate. **All structural drawings have been re-issued as part of addendum.**

END OF ADDENDUM NUMBER THREE - 5 APRIL 1993.

SECTION 02350 - CAISSONS

PART 1 - GENERAL

1.01 SUMMARY

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

A. General

1. The work covered by this Section, without limiting the generality thereof, consists of furnishing all plant, labor, equipment, appliances and material, and performing all operations in connection with the installation of caissons with bell-shaped bases bearing in the clay deposit at the locations and to the lines and grades shown on the Drawings.

2. The Contractor shall include all work necessary to maintain a stable caisson excavation during excavation and concreting. Temporary casing may be required to extend from ground surface down to the top of the clay deposit.

B. Related Work Specified Elsewhere:

1. Section 01400: Quality Control
2. Section 02140: Dewatering
3. Section 02210: Earth Excavation, Backfill, Fill and Grading
4. Section 03200: Concrete Reinforcement
5. Section 03300: Cast-in-Place Concrete

1.03 DEFINITIONS AND REFERENCE STANDARDS

A. Architect: Lawrence K. Cheng Associates

B. Construction Manager (CM): Beacon Construction Co.

C. Engineer: Haley & Aldrich, Inc.

D. ASTM: Specifications of the American Society for Testing and Materials.

E. AWS: Standard Code for Welding in Building Construction of the American Welding Society

F. AISC: Specification of the American Institute of Steel Construction

G. ACI: American Concrete Institute.

H. Code: Massachusetts State Building Code.

1.04 QUALITY ASSURANCE

A. Comply with all rules, regulations, laws and ordinances of the Massachusetts Water Resources Authority, the Commonwealth of Massachusetts, and of all other authorities having jurisdiction. All labor, materials, equipment and services necessary to make work comply with such requirements shall be provided without additional cost to the Owner.

B. Field Monitoring and Testing:

1. Full-time monitoring of caisson installation operations will be provided by the Engineer. No caisson construction activities shall be undertaken except in the presence of the Engineer.

2. The Owner will provide on-site monitoring of concrete placement. Concrete test cylinders will be taken by the Owner’s inspection agency during placement. The Contractor shall cooperate fully with the testing agency to facilitate inspection, and assist in taking and in storing samples.

C. Approvals given by Architect, Engineer or by testing agencies shall not relieve the Contractor of his responsibility for performing work in accordance with the Contract Documents.

1.05 SUBMITTALS

A. All submittals shall be submitted to the Architect for review prior to the start of work as detailed in this specification section.

B. Submit the concrete mix design at least one (1) week prior to the start of work.

C. Caisson location data shall be submitted within five (5) days after concrete is placed. The elevation of each caisson at bearing and cut-off elevations shall be determined to ±0.25 ft. Locations of the centers of completed caissons shall be shown on a Drawing in relation to the design location. Drawings to be submitted shall include the following:

   a. Column lines and north arrow.

   b. Each caisson identified by a separate number.

   c. Elevation of top of caisson to nearest 0.1 foot.

   d. Elevation of caisson bearing surface to the nearest 0.1 foot.

   e. Deviation in feet, to the nearest 0.1 ft., from plan location at cutoff elevation.

1.06 CONDUCT OF THE WORK

A. The Contractor shall be responsible for completing caisson installation operations without damage to nearby utilities.

B. The Contractor shall provide barricades or other measures to minimize conflicts with machinery and vehicles, shall make provisions to control the flow of water, and keep the premises clean and free of water and debris from the drilling and caisson installation work.

1.07 JOB CONDITIONS

A. Subsurface conditions and data are available in a report prepared by GZA GeoEnvironmental, Inc. for the project.

B. The Contractor shall protect adjacent property, public utilities and structures, and completed work from damage associated with the caisson operations. Damage due to caisson installation shall be repaired by the Contractor at his own expense.

C. The general site grade at the time of caisson construction will be the existing site elevations indicated in the Contract Documents.

1.08 LINES AND GRADES

A. The General Contractor shall establish lines and levels.

PART 2 - PRODUCTS

2.01 CONCRETE

A. Concrete for caissons shall conform to the requirements for the Massachusetts State Building Code and ASTM Specification C94 for Ready Mixed Concrete, current edition.

B. The concrete mixture shall have a minimum twenty-eight (28) day compressive strength of four thousand (4,000) psi.

C. Maximum aggregate size shall be three-quarter inches (3/4").

2.02 REINFORCEMENT STEEL

A. Standard deformed steel reinforcement conforming to the requirements of ASTM A615, Grade 60.

PART 3 - EXECUTION

3.01 SEQUENCE OF OPERATIONS AND EQUIPMENT REQUIREMENTS

A. Caissons shall be installed by a contractor specializing in the type of caisson work described hereinafter or having considerable experience on similar installations under similar soil and groundwater conditions.

B. The Contractor shall provide a fully equipped rig in full-time operation at the site during the work, and shall mobilize additional equipment, if necessary, to complete the work on schedule.

C. If any caisson has been bottomed, exposing the suitable bearing soils, the work on that caisson shall be continued until such excavation and concreting has been completed on the same day.

D. The Contractor shall coordinate his caisson operations with other work on the project.

3.02 UTILITIES

A. The Contractor shall protect adjacent property, utilities and structures, and completed work from damage associated with the caisson installation operations. Damage due to caisson installation shall be repaired by the Contractor at his own expense.

3.03 METHOD OF CAISSON INSTALLATION

A. General

1. Caisson shafts shall have a diameter equal to or greater than the minimum diameter shown on the drawings or as specified hereinafter. A minimum of three (3) ft. is required.

2. Due to the groundwater conditions anticipated at the site the caissons may not be able to be belled above the clay surface. Therefore the contractor may elect to either construct a shaft having a diameter equal to that of the bell or construct the bell entirely within the clay.

3. Bell-shaped bases shall have a minimum edge-thickness equal to four inches, measured at the minimum base diameter shown on the drawings. The bell roof shall slope not less than sixty degrees with the horizontal.

4. Caissons shall bear on the hard yellow or blue clay which underlies fill, and which has an allowable bearing capacity equal to or greater than five (5.0) kips per square foot.

5. Caisson diameters shall be increased from the minimum plan dimensions, if less than the required allowable bearing capacity is encountered, as determined by the Engineer or his representative.

6. Monitoring and evaluation of the caissons at any stage will be made promptly by the Engineer or his representative so as not to delay the work by the Contractor. An evaluation will be performed by

entering the caisson to take measurements and perform soil tests as required to determine compliance with the specification requirements. Caissons shall not be concreted until the bearing soil has been tested by the Engineer and found to be in agreement with the specification requirements. After completing a satisfactory test on the bearing soil, the caisson shall be kept free of water until concreting is completed, unless alternative methods for concreting have been submitted and accepted by the Engineer.

B. Caisson Excavation

1. The Contractor shall do all excavation of caisson shafts and bells, and all sheathing, shoring, bracing, pumping, bailing and other incidental work necessary to make and maintain the caisson excavations and to keep them free from water at all times.

2. The method of caisson installation shall be determined by the Contractor, subject to the approval by the Engineer. Caisson installation shall be made by non-displacement methods such as augering, rotary drilling or other methods.

3. The bottom of caissons shall be entirely within the bearing strata. The bearing elevations indicated on the Drawings are approximate, and will be adjusted by the Engineer when the bearing material is encountered during excavation. Penetration into the clay deposit to obtain the required bell diameter shall not exceed 5 ft. The contractor should select the caisson shaft diameters accordingly.

5. If, while excavating for caissons, the Contractor encounters an obstruction, he shall notify the Engineer immediately. Obstructions will be defined as boulders, granite blocks, brickbats, concrete, timber, logs and piles and other man-placed material which prevent the advance of the excavation of the shaft and placement of temporary casing. The Engineer will require the Contractor to probe to locate the extent of the obstruction. After such probing, the Engineer will determine whether the obstruction shall be removed or whether additional caissons shall be drilled.

   The Contractor will be reimbursed for authorized additional work to remove obstructions and backfilling and/or installing additional caissons.

7. Material excavated from caissons shall be removed from the site and properly disposed of if not suitable for use as on-site fill.

C. Concreting

1. When the excavation of a caisson is complete, any inflow of water from the sides or bottoms of the excavation shall be controlled by pumping to permit the placing of the concrete without separation of its constituent materials. The concrete may be dropped through free air after passing through a guide chute or steel funnel placed at the top of the caisson. (If it is not possible to control the inflow of water into the caisson, the Contractor shall submit to the Engineer for consideration, alternate methods for concreting the caisson.)

2. When any caisson is concreted in such a manner as to allow part of the concrete to set for more than two hours before the balance is placed, the resulting stoppage surface shall be left approximately level. Such a surface shall then be thoroughly cleaned and, if required by the Engineer, roughed and slushed with 1:1 grout before more concrete is placed.

3. All concrete for the caissons shall be carefully placed so as to form substantially a monolith composed of a cylindrical shaft, or a cylindrical shaft resting on a bell-shaped base. The concrete in each caisson, upon completion, shall be within one inch of its cut-off elevation as shown on the Drawings, carefully leveled and smoothed off.

4. Steel cylinders used for supporting the sides of the caisson shaft during excavation and filling, may be withdrawn as the concrete is deposited; the top of the concrete being placed shall be kept a sufficient distance above the bottom end of the lowest steel cylinder being withdrawn, to prevent the earth from coming in from the sides and mixing with the fresh concrete.

D. Dowels

Dowels shall be installed, in the position called for on the Drawings, after each caisson is concreted to its cut-off elevation and before the concrete attains its initial set. Dowels must be placed accurately with respect to column centerlines. The Contractor shall be responsible for the cost of any additional concrete work necessitated by the improper placement of dowels or improper positioning of caissons.

3.06 REMOVAL OF CASINGS

A. Temporary casing sections shall be removed within the concreted portion of the caisson excavation as concrete is being placed. The bottom of casing shall be a maximum of one (1) foot above the concrete level until the concrete has achieved initial set, to prevent caving soils from entering the excavation and contaminating the concrete.

3.07 IMPROPER INSTALLATION

A. The cost of any and all changes due to improper installation of drilled caissons shall be paid by the Contractor. This shall include Engineer's additional services made necessary by such improper installation as well as costs for labor and materials.

3.08 TOLERANCES AND CRITERIA FOR ACCEPTANCE

A. Caissons shall be accurately located. Any caisson which has the center of the top of shaft more than D/10 from the design location shown on the Drawings, or which is out of plumb by more than H/60, where D is the least diameter of the caisson and H the overall length or height, shall have its condition corrected by means of reinforcing in the concrete, or otherwise, to the satisfaction of the Engineer, at no additional cost to the Owner.

B. The caisson bearing surface and bell geometry shall be prepared in accordance with the criteria established herein.

C. The top of concrete shall be within one inch of the design cut-off.

3.09 FIELD QUALITY CONTROL

A. Testing Laboratory services will be in accordance with Section 01400.

B. Full-time monitoring of caisson installation operations will be provided by the Engineer. Caisson construction activities shall not be undertaken except in the presence of the Engineer.

C. The Engineer will furnish a caisson log, showing the as-built shaft diameter top and bottom elevation, casing used, estimated elevation of top of bearing stratum, reinforcement and observed irregularities, deficiencies or deviations from the Contract Documents.

E. Approvals given by the Architect, or by testing agencies will not relieve the Contractor of his responsibility for performing the Work in accordance with the Contract Documents.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Caissons shall be measured from the top elevation of the caisson as determined from the Contract Drawings to the actual bearing elevation of the caisson. The latter shall be determined as the average elevation of the bearing material on which the caisson is formed.

4.02 PAYMENT

A. Pay items for the work of this section shall consist of a lump sum base bid, two unit price items, and extra work, as described below.

B. The lump sum base bid price shall cover all costs to the Owner for the caisson work as called for on the Drawings and in this section of the specification, including all required permits. It is intended that this price cover the entire cost of the work, except for unforeseen developments and for changes which may be made by the Architect.

C. Additional concrete, at $300 per cubic yard. This item shall cover all costs to be added to the contract price for increasing the total volume of concrete due to increasing the number, length, or size of caissons, over those shown on the drawings. Concrete shall be measured by the volume of the caissons, computed using the shaft and base diameters and the observed base and top elevations.

D. Decreased concrete, at $200 per cubic yard. This item shall cover all costs to be deducted from the contract price for decreasing the total volume of concrete due to decreasing the number, length or size of caissons as compared to those shown on the contract drawings. Measurement shall be as described for item C above.

E. Extra work charges shall apply only to work performed on locating and removing obstructions as specified. Extra work shall be charged on the basis of $500 per hour and shall include all labor, materials and equipment necessary. Extra work charges shall apply only when the work requires more than 1 hour per caisson.

F. The caisson contractor may, at his own option and cost, increase the shaft diameter of any caisson from the size indicated on the drawings. This change shall not affect the prices stated above, and for price purposes the shaft diameters shall continue to be computed as indicated on the drawings, regardless of their diameter as constructed.

END OF SECTION

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SECTION 02710 - UNDERSLAB DRAINAGE SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes basement underslab foundation drainage systems.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 02200, "Earthwork", for excavation, subgrade preparation, and placement and compaction of drainage fill materials and geotextiles.
2. Section 02700, "Sanitary and Storm Sewerage Systems", for manhole structures and installation of recharge system.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of underslab drainage material required.

C. Shop drawings of drainage system.

PART 2 - PRODUCTS

2.1 DRAINAGE PIPE AND FITTINGS:

A. General: Furnish drainage pipe complete with fittings, adapters, couplings, collars, floor cleanouts, and joint materials.

B. Perforated Polyvinyl Chloride Pipe: 4 inches diameter, ASTM D 2729.

C. Floor Cleanouts: Iron swept body with heavy brass plug and raised nut, 4 inches in diameter, gas tight; Zurn Smith, Wade or equal. Provide with Wade W-8400 or equal brass access cover with scoriated brass top for flush floor slab mounting.

2.2 EJECTION/SUMP PIT:

A. Provide reinforced precast concrete concrete manhole section, cored to receive underslab drainage pipe and prepared for installation of sump pump by others; minimum 48 inches inside diameter and 6 inches wall thickness, complying with requirements indicated in Section 02700.

1. Steps: Ductile iron or cast aluminum, cast in place.
2. Grade Rings: As required to achieve indicated elevation.

PART 3 - EXECUTION

3.1 INSPECTION:

A. General: Examine subgrade to receive underslab drainage system to verify suitability. Do not begin installation until subsurface conditions are satisfactory to accept drainage system.

1. Verify that there are no low areas, areas where unsatisfactory bearing soil may occur, and that the subgrade is a level and firm solid bed for drain system.
2. Verify that subgrade is excavated to proper depth to permit full thickness of drainage fill and drain pipe cover indicated.

3.2 INSTALLATION:

A. Excavate for an install precast ejection/sump pit as indicated in Section 02700, with top rim of section flush or slightly above indicated floor slab elevation.

B. Install geotextile filter fabric over subgrade as indicated, lapping edges a minimum of 18 inches and leaving slack at perimeters to backwrap drainage fill a minimum of 24 inches.

C. Drainage Fill: Place supporting layer of drainage fill material over compacted subgrade where drainage pipe is to be laid to a compacted depth of not less than 4 inches.

D. Laying Drain Pipe: Lay drain pipe solidly bedded in filtering material. Provide full bearing for each pipe section throughout its length to true grades and alignment.

1. Lay perforated pipe with perforations down and joints tightly closed in accordance with pipe manufacturer's recommendations. Provide collars and couplings as required. Seal joints in accordance with local practices having jurisdiction.
2. Install floor cleanouts as indicated.

E. Testing Drain Lines: Test or check lines before backfilling to assure free flow to sump pit. Remove obstructions, replace damaged components, and retest system until satisfactory.

F. After testing drain lines, place additional drainage fill around and over pipe to a minimum depth of 4 inches cover over top of drain line (12 inches minimum total compacted thickness). Place and compact drainage fill in 4 inch lifts to density indicated in Section 02200.

END OF SECTION 02710

SECTION 07120 - FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes fluid-applied polymer-modified elastomeric waterproofing systems.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for waterproofing specified, including data substantiating that material complies with specified requirements.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced Installer who has completed fluid-applied waterproofing applications similar in material, design, and extent to that indicated for Project and that has resulted in construction with a record of successful in-service performance.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver primary waterproofing materials to job site in manufacturer's original, unopened containers, bearing manufacturer's name and label and the following information:

1. Product name.
2. Product description (generic product classification).
3. National standards with which the product complies.
4. Application instructions.

1.6 PROJECT CONDITIONS:

A. Substrate: Proceed with waterproofing operations only after substrate construction and penetrating work have been completed.

B. Weather: Proceed with waterproofing operations only when existing and forecast weather conditions will permit work to be performed in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 POLYMER-MODIFIED ELASTOMERIC WATERPROOFING:

A. Single-component hydrocarbon polymer in hydrocarbon solvent liquid applied membrane system formulated for application to substrate type indicated, and complying with the following requirements:

1. Solids Content: 66 percent.
2. Water Vapor Permeability: 0.28 perms maximum for 40 mil-thick membrane per ASTM E 96.
3. Water Absorption: Maximum 0.50 percent weight gain for 40 mil-thick membrane per ASTM D 95.
4. Minimum Ambient Application Temperature: 15 deg F.

B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to "Ultra-Shield"; GMX, Inc.

2.2 MISCELLANEOUS MATERIALS:

A. In addition to primary waterproofing materials, provide the following:

1. Primer/Filler/Sealer: As recommended by manufacturer of fluid-applied waterproofing compound.
2. Flashings, Cant Strips and Accessories: As recommended by manufacturer of waterproofing compound.
3. Protection Course: Premolded, 1/8-inch-thick, semirigid board consisting of mineral-stabilized asphalt core sandwiched between layers of asphalt-saturated felt, surface-coated with asphalt and sealed to core under heat and pressure, and provided with polyethylene film facings.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBSTRATE:

A. Clean substrate of projections and substances detrimental to work; comply with instructions of prime materials manufacturer.

B. Install cant strips and similar accessories as shown or as recommended by prime materials manufacturer even though not shown.

C. Fill voids, seal joints, and prime substrate as recommended by manufacturer.

3.2 INSTALLATION:

A. General: Comply with manufacturer's written installation recommendations, including preparation of substrate surfaces, detail coatings of joints and planar changes in substrate, and priming of substrates.

B. Mix separately packaged components in accordance with manufacturer's written recommendations.

C. Apply waterproofing membrane material to substrates and adjoining surfaces indicated to receive membrane. Apply in accordance with manufacturer's recommendations to obtain thicknesses specified and using spray application and techniques best suited for substrate to which applied.

   1. If two-coat application is required to obtain membrane thickness specified below, apply second coat only after initial coat has cured as recommended by manufacturer.
   2. Provide 60-mil (average) membrane thickness, with minimum 50-mil thickness.

D. Install sheet-type flashings and joint covers where indicated and as recommended by prime materials manufacturer. Extend flashings onto perpendicular surfaces and other work penetrating substrate to not less than 6 inches beyond finished surface to be applied over waterproofing.

E. Permit membrane to cure under conditions that will not contaminate or deteriorate waterproofing material. Block off traffic and protect membrane from physical damage.

F. Install protection course on cured membrane without delay to minimize period of membrane exposure.

   1. On vertical surfaces comply with waterproofing manufacturer's recommendations for adhesion of protection course to membrane.

END OF SECTION 07120

SECTION 07900 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes joint sealants for the following locations:

1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:
    - a. Control joints in cast-in-place concrete, brick unit masonry, and Exterior Insulation and Finish Systems (EIFS).
    - b. Joints between different exterior materials.
    - c. Perimeter joints between materials listed above and frames of doors and windows, louvers, and other openings.
    - d. Other joints as indicated.
2. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:
    - a. Perimeter joints of exterior openings where indicated.
    - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, elevator entrances, and other assemblies.
    - c. Perimeter joints of bath fixtures and bath tile.
    - d. Non-working finish joints between different abutting materials.

B. Work Specified Elsewhere: The following Sections include sealant work not part of this Section:

1. Section 07270, "Firestopping", for sealants and fillers installed as firestopping.
2. Section 07600, "Flashing and Sheet Metal", for sealing lock joints and seams related to flashing.
3. Section 08800, "Glass and Glazing", for sealants used in glazing.
4. Section 09250, "Gypsum Drywall", for sealing concealed perimeter joints of gypsum board partitions to reduce

sound transmission.

1.3 SYSTEM PERFORMANCE REQUIREMENTS:

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data from manufacturers for each joint sealant product required.

   1. Certification by joint sealant manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.

C. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.

D. Samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

E. Certificates from manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated, and product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.

F. Qualification data complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project names addresses, names of Architects and Owners, plus other information specified.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

1. Installer shall be approved by the sealant manufacturer.

B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

C. Product Testing: Provide comprehensive test data for each type of joint sealant based on tests conducted by a qualified independent testing laboratory on current product formulations within a 24-month period preceding date of Contractor's submittal of test results to Architect.

1. Test elastomeric sealants for compliance with requirements specified by reference to ASTM C 920. Include test results for hardness, stain resistance, adhesion and cohesion under cyclic movement (per ASTM C 719), low-temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging, and effects of accelerated weathering.
2. Include test results performed on joint sealants after they have cured for 1 year.

D. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:

1. Joints in field-constructed mock-ups of exterior finish assemblies specified in Sections 04200 and 07241 that are indicated to receive elastomeric joint sealants specified in this Section.

[*]E. Additional Testing and Inspection: The Owner shall employ and pay for a qualified independent inspection agency to verify that the work of this Section is performed in compliance with the Contract Documents.

[*]F. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of the Division 1 Section covering this activity.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. **Store and handle materials in compliance with manufacturer's** recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.7 PROJECT CONDITIONS:

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg F (4.4 deg C).
2. When joint substrates are wet.

B. Obtain Architect's written approval before installing exterior joint sealants between 15 November and 15 March.

C. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

D. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL:

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide color of exposed joint sealants to comply with the following:

1. Provide custom colors to match Architect's samples where indicated in sealant schedule.
2. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated unless otherwise indicated.

2.2 ELASTOMERIC JOINT SEALANTS, GENERAL:

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated for each Elastomeric Joint Sealant specified in this Section, including those requirements referencing ASTM C 920 classifications for Type, Grade, Class, and Uses.

B. Additional Movement Capability: Where additional movement capability is specified in Elastomeric Joint Sealant Data Sheet, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for Uses indicated.

2.3 ELASTOMERIC JOINT SEALANT DESIGNATED "ES-1":

A. Description: High performance low modulus modified urethane sealant for vertical and non-traffic horizontal surfaces.

B. Performance Characteristics: Complying with ASTM C 920 as follows:

1. Type: M.
2. Grade: NS.
3. Class: 25.
4. Uses: NT, M, A, and O as follows: concrete, galvanized steel, and color anodized aluminum.

C. Additional Movement Capacity: 50% movement in extension or compression; 100% total.

[*]D. Colors: Assume two [ ] colors from manufacturer's standard product range.

E. Acceptable Products:

1. "Dynatrol II", Pecora.
2. "Dymeric Plus", Tremco.

2.4 ELASTOMERIC JOINT SEALANT DESIGNATED "ES-2":

A. Description: One-part mildew-resistant acid curing silicone sealant formulated with fungicide for sealing interior non-porous joints in areas of high moisture.

B. Performance Characteristics: Complying with ASTM C 920 as follows:

1. Type: S.
2. Grade: NS.
3. Class: 25.
4. Uses: NT, G, A, and O as follows: porcelain, enameled steel, vitreous china, ceramic tile, composition plastics, and plastic laminates.

C. Acceptable Products:

1. "Dow Corning 786", Dow Corning Corp.
2. "SCS 1702 Sanitary", General Electric Co.
3. "863 #345 White", Pecora.

[*]2.5 ELASTOMERIC JOINT SEALANT DESIGNATED "ES-3":

[*]A. Description: High performance low modulus neutral-curing silicone sealant, color as selected from manufacturer's standard range.

[*]B. Performance Characteristics: Complying with ASTM C 920 as follows:

1. Type: S.
2. Grade: NS.
3. Class: 25.
4. Uses: NT, M, A, and O as follows: concrete, EIFS, galvanized steel, and color anodized aluminum.

[*]C. Additional Movement Capacity: 100% movement in extension, 50% movement in compression; 150% total.

[*]D. Acceptable Product:

1. "Dow Corning 790", Dow Corning.

2.6 LATEX JOINT SEALANT DESIGNATED LS-1:

A. Description: Manufacturer's standard one-part mildew-resistant paintable acrylic-emulsion latex sealant for exposed applications on interior and protected exterior locations.

B. Performance Characteristics: Complying with ASTM C 834 as follows:

1. Type: S.
2. Grade: NS.
3. Movement Capability: 5 percent in both extension and compression for a total of 10 percent.

C. Available Products: Subject to compliance with requirements, latex joint sealants that may be incorporated in the Work include, but are not limited to, the following:

1. "AC-20," Pecora Corp.
2. "Sonolac," Sonneborn Building Products Div., ChemRex, Inc.
3. "Tremco Acrylic Latex 834," Tremco, Inc.

2.7 JOINT SEALANT BACKING:

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding strips of flexible plastic foam of one of the materials indicated below and of size, shape, and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Closed-cell polyethylene foam, nonabsorbent to liquid water and gas, nonoutgassing in unruptured state.
2. Proprietary, reticulated, closed-cell polymeric foam, nonoutgassing, with a density of 2.5 pcf and tensile strength of 35 psi per ASTM D 1623, and with water absorption less than 0.02 gms/cc per ASTM C 1083.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS:

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and as indicated.

1. Acceptable Products: Subject to compatibility with specified joint sealants:

   a. Primer P-75, Pecora.
   b. Primer #733, Sonneborn.
   c. Primer #P1, Tremco.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. General: Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

1. Do not install sealants to painted or organic coated surfaces unless adherence has been verified.

B. Inspection of EIFS joint substrates:

1. Verify that joints are 1 inch in width; do not install joint sealants in joints less than 7/8 inch or greater than 1-1/4 inch in width.
2. Verify that EIFS finish coat (containing aggregate) has not been installed in joint width.
3. Verify that waterproof compressible foam sealer has been properly installed at all EIFS panel joints as indicated; do not install sealants or backers in joints missing compressible foam sealers.

C. Beginning installation of joint sealants and accessories constitutes acceptance of substrate conditions. Subsequent joint failure due to failure to properly examine or require correction of substrates shall be the responsibility of this Section.

3.2 PREPARATION:

A. Surface Cleaning of Joints: Clean out joints immediately before installing primers or sealers, if no primer is required, to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Use solvent cleaner recommended by sealant manufacturer for joint substrate.
2. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
3. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading,

or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

4. Remove laitance and form release agents from concrete.
5. Clean metal, glass, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where indicated below and where recommended by joint sealant manufacturer based on prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

[*] 1. All joints, without exception, indicated to receive sealants ES-1 [and ES-3] shall be primed.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS:

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

1. Do not install sealants until primer has dried.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications, and conditions indicated.

1. Comply with ASTM C 1193 if applicable.

C. Latex Sealant Installation Standard: Comply with requirements of ASTM C 790 for use of latex sealants.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position

required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

a. Install joint filler rods 25 percent greater in diameter than joint width, unless otherwise indicated.
b. Do not leave gaps between ends of joint fillers.
c. Do not stretch, twist, puncture, or tear joint fillers.
d. Do not install wet joint fillers. If fillers become wet before installation of sealant, remove and replace.

2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
2. Provide flush joint configuration, per Figure 5B in ASTM C 962, where indicated. Use masking tape to protect adjacent surfaces of recessed tooled joints.

[*]3.4 FIELD QUALITY CONTROL:

A. Field testing and inspection services will be provided by an independent agency paid by the Owner as indicated in Quality Assurance article to verify compliance with the contract documents as follows:

1. Inspection and verification of product handling and mixing; project and environmental conditions; joint preparation and priming; joint dimensional criteria; installation of backer rods; and sealant installation.

B. Provide inspection agency with access to work at all times and wherever it is in progress, including access to staging during installation work.

C. Remove and repair work determined by the testing and inspection agent not to be in compliance with Contract Documents at no additional cost to the Owner, as indicated elsewhere in the Contract Documents.

3.5 CLEANING:

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION:

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

3.7 SEALANT SCHEDULE:

A. General: Install specified sealants at all joint substrates as indicated. If a substrate condition is not indicated, seek clarification from Architect.

B. **Sealant ES-1** (Non-Sag High-Performance Urethane):

[*] 1. Exterior non-traffic control and expansion joints in concrete, [and] masonry [ ].
[*] 2. Exterior perimeters of windows, doors, louvers, and other penetrations in exterior finish [except where Sealant ES-3 is indicated].

C. **Sealant ES-2** (Mildew-Resistant Silicone):

1. Joints between tub/shower enclosures and adjoining construction.
2. Joints between ceramic mosaic floor tile and water closet perimeter, bath tub, and tile base.
3. Joints between lavatory and sink rims and countertops, and at perimeter of countertop splash with wall surface.
4. Joints between resilient sheet flooring and wall base.

[*]D. Sealant ES-3 (High-Performance Neutral-Curing Silicone):

1. Exterior control and expansion joints in EIFS system, and between EIFS system and all other materials, including concrete, masonry, exterior perimeters of windows, doors, louvers, and other penetrations in exterior finish.

E. Sealant LS-1 (Acrylic Latex):

1. Interior finish joints between gypsum wallboard and adjoining concrete, masonry, finish carpentry, cabinetry, and opening frames.
2. All other interior joints between dissimilar materials not indicated otherwise.

END OF SECTION 07900

OAK TERRACE
BUILDING FINISH SCHEDULE

TOWER FIRST FLOOR

RM NO	ROOM NAME	FLOOR	BASE	WALLS	CEILING	REMARKS
101	VESTIBULE	QUARRY TILE	QUARRY TILE	GWB	GWB	WAINSCOT
102	VESTIBULE	QUARRY TILE	QUARRY TILE	GWB	GWB	WAINSCOT
103	RETAIL	CONCRETE	VINYL	GWB	ACOUSTIC	
104	RETAIL	CONCRETE	VINYL	GWB	ACOUSTIC	
105	FIRE CONTROL	VCT	VINYL	GWB	ACOUSTIC	1 HR ENCLOSURE
106	TRASH ROOM	CONCRETE	-	PLASTIC PANEL	ACOUSTIC	2 HR ENCLOSURE
107	MAIN LOBBY	QUARRY TILE	QUARRY TILE	GWB	GWB	WAINSCOT
108	MAIL ROOM	VCT	VINYL	GWB	ACOUSTIC	
109	OFFICE	CARPET	VINYL	GWB	ACOUSTIC	
110	OFFICE	CARPET	VINYL	GWB	ACOUSTIC	
111	CORRIDOR	CARPET	VINYL	GWB	ACOUSTIC	
112	OFFICE	CARPET	VINYL	GWB	ACOUSTIC	
113	KITCHENETTE	SHEET VINYL	VINYL	MRGWB	ACOUSTIC	
114	TOILET	CERAMIC TILE	CERAMIC TILE	MRGWB	ACOUSTIC	
115	OFFICE	CARPET	VINYL	GWB	ACOUSTIC	
116	JANITOR	VCT	VINYL	MRGWB	ACOUSTIC	
* T1	STAIR	CONCRETE	SEE NOTE 1	GWB	-	2 HR ENCLOSURE
* T2	STAIR	CONCRETE	SEE NOTE 1	GWB	-	2 HR ENCLOSURE

TOWER BASEMENT

RM NO	ROOM NAME	FLOOR	BASE	WALLS	CEILING	REMARKS
-	CORRIDOR	CARPET	VINYL	GWB	ACOUSTIC	
B1	LAUNDRY	QUARRY TILE	QUARRY TILE	MRGWB	ACOUSTIC	
B2	WATER & SPRINK	CONCRETE	VINYL	GWB/CONCRETE	ACOUSTIC	2 HR ENCLOSURE
B3	EMER ELECTRICAL	CONCRETE	VINYL	GWB/CONCRETE	ACOUSTIC	2 HR ENCLOSURE
B4	MAIN ELECTRICAL	CONCRETE	VINYL	GWB/CONCRETE	ACOUSTIC	2 HR ENCLOSURE
* B5	STORAGE	CONCRETE	VINYL	GWB/CONCRETE	ACOUSTIC	
* B6	SUMP ROOM	CONCRETE	VINYL	GWB/CONCRETE	-	
-	SMOKE VESTIBULE	VCT	VINYL	GWB	GWB	2 HR ENCLOSURE
* T1	STAIR	CONCRETE	SEE NOTE 1	GWB	-	2 HR ENCLOSURE
* T2	STAIR	CONCRETE	SEE NOTE 1	GWB	-	2 HR ENCLOSURE

OAK TERRACE
BUILDING FINISH SCHEDULE

LOWRISE PUBLIC SPACES

	ROOM NAME	FLOOR	BASE	WALLS	CEILING	REMARKS
	STAIR 1	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
*	STAIR 2	CONCRETE	SEE NOTE 1	GWB	GWB	2 HOUR ENCLOSURE
	STAIR 3	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
*	STAIR 4	CONCRETE	SEE NOTE 1	GWB	GWB	2 HOUR ENCLOSURE
	STAIR 5	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
*	STAIR 6	CONCRETE	SEE NOTE 1	GWB	GWB	2 HOUR ENCLOSURE
	STAIR 7	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
	STAIR 8	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
*	STAIR 9	CONCRETE	SEE NOTE 1	GWB	GWB	2 HOUR ENCLOSURE
	STAIR 10	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
*	STAIR 11	CONCRETE	SEE NOTE 1	GWB	GWB	2 HOUR ENCLOSURE
	STAIR 12	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
*	STAIR 13	CONCRETE	SEE NOTE 1	GWB	GWB	2 HOUR ENCLOSURE
	STAIR 14	VCT/VINYL	VINYL	GWB	GWB	1 HOUR ENCLOSURE
	TRASH ROOM	CONCRETE	-	PLASTIC PANEL	GWB	2 HOUR ENCLOSURE

UNIT FINISHES (TYPICAL FOR ALL UNITS)

	ENTRY AREA	CARPET	VINYL	GWB	GWB	
	LIVING ROOM	CARPET	VINYL	GWB	GWB	
	DINING ROOM	CARPET	VINYL	GWB	GWB	
*	KITCHEN	VCT	VINYL	MRGWB	GWB	
	BEDROOMS	CARPET	VINYL	GWB	GWB	
*	BATHROOM	SHEET VINYL	VINYL	MRGWB	MRGWB	CLG HEIGHT 7'-3"
	LAVATORY	SHEET VINYL	VINYL	GWB	GWB	
	CORRIDORS	CARPET	VINYL	GWB	GWB	
	STAIRS	CARPET	WOOD	GWB	GWB	
	LAUNDRY CLOSET	SHEET VINYL	VINYL	GWB	GWB	

OAK TERRACE
BUILDING FINISH SCHEDULE

TOWER TYPICAL FLOOR (SECOND THROUGH TENTH)

RM NO	ROOM NAME	FLOOR	BASE	WALLS	CEILING	REMARKS
	CORRIDOR	CARPET	VINYL	GWB	ACOUSTIC	
	TRASH ROOM	VCT	VINYL	GWB	ACOUSTIC	1 HR ENCLOSURE
	ELECTRIC CLOSET	VCT	VINYL	GWB	ACOUSTIC	1 HR ENCLOSURE
	SMOKE VESTIBULE	VCT	VINYL	GWB	GWB	2 HR ENCLOSURE
* T1	STAIR	CONCRETE	SEE NOTE 1	GWB	GWB	2 HR ENCLOSURE
* T2	STAIR	CONCRETE	SEE NOTE 1	GWB	GWB	2 HR ENCLOSURE

TOWER PENTHOUSE

	ROOM NAME	FLOOR	BASE	WALLS	CEILING	REMARKS
	MECHANICAL ROOM	CONCRETE	VINYL	GWB	GWB	2 HR ENCLOSURE
	ELECTRIC CLOSET	CONCRETE	VINYL	GWB	GWB	2 HR ENCLOSURE
	ELEVATOR MACH	CONCRETE	VINYL	GWB	GWB	2 HR ENCLOSURE
* T1	STAIR	CONCRETE	SEE NOTE 1	GWB	GWB	2 HR ENCLOSURE

* NOTE 1: AT 2 HOUR EGRESS STAIRS, PAINT EXPOSED STEEL STRINGERS IN LIEU OF VINYL BASE. INSTALL VINYL BASE AT FLOOR LANDINGS WHERE STRINGERS DO NOT MEET GWB WALL FINISH.

16 July 1993

ADDENDUM NUMBER FOUR

This Addendum adds to, deletes from, clarifies, or alters the original Contract Document package prepared by Lawrence K. Cheng Associates, Inc. dated 4 September 1992 and amended through 5 April 1993, as follows :

I. TECHNICAL SPECIFICATIONS:

A. Section 04200, "Unit Masonry":

Subparagraph 2.2 B.6.a.: Substitute "Suffield", K.F. Brick for "Old Port Narrow Range", Morin Brick.

B. Section 08500, "Aluminum Windows":

Subparagraph 2.1. : Add the following after A.4
5. Peerless Model 4100

C. Section 12500, "Window Treatment":

Substitute roller shades for horizontal blinds at all windows according to Alternate Number 2 of ATTACHMENT NUMBER 4 in Contract Documents dated 4 Sept. 1992.

D. Section 15400, "Plumbing":

1. Article 2.14

   Insert after the third paragraph, "Cement lined hot water tank with field installed fiberglass blanket insulation and with ten-year warranty may be substituted in lieu of the pre-insulated tank as specified."

2. Article 2.15

   Kitchen sinks should be substituted as follows:
   a. P-4 "Dayton D-12522" by Elkay
   b. P-4A "Dayton D-12521 L or R" by Elkay
   c. P-4B "Dayton D-23322" by Elkay

E. Section 15500, "Fire Protection":

At Article 2.12 A., substitute "750 GPM" for "1500 GPM"; and at C., substitute "75 HP" for "125 HP".

F. Section 15600, "HVAC":

Article 2.01.A., substitute the following

Piping: Schedule 10 light wall piping for 2-1/2" or larger, and type "M" copper for 2" and smaller.

Fittings:

2 1/2" and larger Victaulic grooved fittings.

G. Section 16000, "Electrical":

Aluminum feeders may be substituted for the copper as specified, provided that the substitution is made in accordance with provisions specified in Article 3.19.

II. DRAWINGS:

A. Site/Civil Drawings:

C-1
Revised routing for telephone connection. This drawing is re-issued with this addendum.

L-3
Under Planting Schedule, for tree type T2, substitute 3" to 3-1/2" caliber for 3-1/2" to 4", and substitute 6 for 10 in quantity.

B. Architectural Drawings:

A2.2
Additional dimensions are provided. Drawing is re-issued with this addendum.

C. Structural Drawings:

Clarifications were made on drawings S6, S7, S9, S10, S15, and S16A, and were notated as revision number 4 on each drawing. These six drawings are re-issued with this addendum.

D. Mechanical Drawings:

H-11
Under Exhaust Fan Schedule, substitute Broan #671 ceiling fan in lieu of Nutone QT-80 and QT-110 for EF-1 and EF-2.

E. Electrical Drawings:

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Delete changes under Revision #2 (Addendum Number Three) dated 4 April 1993, and revert to original design dated 3 September 1992.

END OF ADDENDUM NUMBER FOUR - 16 JULY 1993.

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亞美社區發展協會
Asian Community Development Corporation

360-B TREMONT STREET
BOSTON, MASSACHUSETTS 02116
TELEPHONE (617) 482-2380

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Bonnie Wolf
Assistant Director

To: GENERAL CONTRACTOR

Date: September 4, 1992

Re: **OAK TERRACE**

The Asian Community Development Corporation ("ACDC"), developer of Oak Terrace, invites you to submit a contract price for the construction of an 88 (eighty-eight) unit rental housing development located in the Chinatown neighborhood of Boston.

The contract price should be a lump sum price based upon September 3, 1992 drawings. We are requesting you to submit a price based upon a complete project which meets City, State and Federal Code requirements as well as the information contained in Plans, Specifications, and other materials included in this package. In addition, we would like you to list all exceptions in drawings and specifications as well as inconsistencies and how you propose to solve them and at what cost. You are encouraged to suggest, as alternates, your modifications to the plans and specifications to achieve savings both in time and cost. Value engineering will be a factor in the award of this contract.

Please furnish your construction proposal on the attached proposal form with a summary on MHFA Form 2328. Please also provide three copies of your proposal.

Demolition of the existing building will be completed by the City of Boston prior to construction start, however you are to accept the existing site condition relative to remaining rubble, utility remnants, etc..

Your proposal is due on October 5, 1992, noon. We anticipate a November 15, 1992 construction start. As a condition of the contract, a certificate of occupancy for this project must be issued no later December 31, 1993. Please indicate the latest date that construction must be started in order to secure a certificate of occupancy with and/or without a cost premium.

Please submit a construction schedule showing how you propose to meet the December 31, 1993 completion date, including your plan to procure all long lead items.

This project is being in part funded by the City of Boston, the Massachusetts Housing Finance Agency and the AFL-CIO Housing Investment Trust. The project must be 100% constructed by contractors, subcontractors and sub-subcontractors which employ only members of unions affiliated with the local Building and Construction Trades Council, AFL-CIO, having jurisdiction in the area and/or The Building and Construction Trades Department, AFL-CIO. In addition, the General Contractor must provide a certification as to the use of union construction for the project in the form attached hereto as Exhibit B. The project is governed by the Boston Jobs Ordinance, and MHFA Equal Opportunity / Affirmative Action, bonding, insurance, retainage and other requirements.

The anticipated construction budget is $8.6 million. The contract for this project will only allow for the following change orders during construction:

1. change orders requested by the Owner; and
2. change orders required by public authorities pursuant to circumstances not ascertainable by the Contractor prior to execution of the construction contract.

Please note that the building permit and bond costs should be included in your contract price and should be listed out separately.

The developer has no obligation to accept any contract proposals submitted.

Questions concerning the enclosed materials should be directed to Lawrence K. Cheng, Lawrence K. Cheng Associates, c/o Williams Associates Inc., 497 Massachusetts Avenue, Cambridge, MA 02139. He can be reached at telephone number (617) 547-6757. If Lawrence Cheng is unavailable you may ask for Steve Baker at the same phone number.

C Lee

Carol Lee
Executive Director

Enc.

September 4, 1992

Oak Terrace
888 Washington Street
Boston, MA 02111

BID PROPOSAL FORM

PROJECT: Oak Terrace
888 Washington Street
Boston, MA 02111

DATED: ______________________

To: Asian Community Development Corporation
360B Tremont Street
Boston, MA 02116

Gentlepeople:

The undersigned

____

(A corporation of, organized and existing under the laws of the State of: ____).

____

(A partnership consisting of: ____________________________________

____

____).

(An individual trading as: ______________________________________).

of the City of ____

in the State of ____).
agrees that if this bid is accepted as hereinafter provided he/she will, except to the extent otherwise specifically provided in the Contract Documents, provide all labor, materials, supplies, tools, plant and equipment necessary to perform all work described in Section 01010 of the Technical Specifications in strict accordance with the terms and provisions of this Contract for the construction of the aforementioned project in accordance with these documents for the following **BREAKDOWN OF COSTS:**

Bidders Initials:____

BID ITEM 1 - GENERAL CONDITIONS as described in the attachment to this Proposal Form.

____

____Dollars($_______________)

BID ITEM 2 - CONSTRUCTION COST

2A - GENERAL CONSTRUCTION WORK, including all allowance items, in accordance with breakdown of Divisions #3 through #14, inclusive as described in the attachment to this Proposal Form.

____

____Dollars($_______________)

2B - MECHANICAL AND ELECTRICAL WORK in accordance with breakdown of Divisions #15 and #16 as described in the attachment to this Proposal Form.

____

____Dollars($_______________)

2C - SITE DEVELOPMENT/LAND in accordance with breakdown of Division #2 as described in the attachment to this Proposal Form.

____

____Dollars($_______________)

BID ITEM 3 - CONSTRUCTION MANAGER/GENERAL CONTRACTOR FEE

3A - BUILDERS OVERHEAD - ____________________________________

____Dollars($_______________)

3B - BUILDERS PROFIT - ______________________________________

____Dollars($_______________)

BID ITEM 4 - PERFORMANCE AND PAYMENT BOND PREMIUMS

____

____Dollars($_______________)

TOTAL OF BID ITEMS #1 + 2A + 2B + 2C + 3A + 3B + 4

____

____Dollars($_______________)

Bidders Initials: _____

NOTE - The breakdown requested above is for bid analysis and accounting purposes only. It is intended to award the project as a whole, and not in parts.

Further, as part of this proposal, the undersigned agrees to execute such alternate proposals (Additive or Deductive) as may be set forth in the Schedule of Alternate Proposals as attached to this Proposal Form.

Further, as part of the proposal, the undersigned provides the unit prices indicated on the attached schedule for designated work. These unit prices shall be for additions to or deletions from the work to be performed under the basic Contract during the entire life of said Contract but shall be considered as payment forms ONLY and not for the purposes of determining contract award.

Further, as part of the proposal, the undersigned agrees that the overhead and profit for extra work if ordered on a Time and Material basis in accordance with Article 12 of the Conditions will on the same percentage basis as listed in Bid Item #3.

It is understood that the Owner reserves the right to accept or reject any and all bids that the Owner deems to be in his best interest; he further reserves the right to negotiate with any bidder or to award a contract to other than the low bidder or a non-bidder and otherwise to proceed with the Project as best suits the intent of the work.

Acknowledgement is hereby made of the following addenda supplements to the Drawings and Specification:

Addendum No.____________________Dated__________________

Addendum No.____________________Dated__________________

Addendum No.____________________Dated__________________

Upon notification of acceptance of this proposal, the undersigned agrees to execute a contract in the form as stated within these contract documents for the amount stated.

Prices quoted shall be guaranteed for

____
days after date of proposal.

The Undersigned will furnish, within three (3) days (or as set forth in the Invitation) attachments as included with this Bid; a Manning Table - Attachment #5, and Principal/Contractor list - Attachment #6 on each of the individual attachments hereto and agrees to execute the Work in accordance with said Manning Table using nominated Contractors and Personnel to deviate there from only with the express approval of the Owner.

Bidders Initials:_____

By submission of this Proposal, the Undersigned acknowledges that they have visited the site, informed themselves of the existing conditions, and have included in the Proposal a sum to cover the costs of all items in the contracts.

Respectfully submitted,

Contractor

By:___________________________________Title:____________________

BusinessName:____

Address:____

TelephoneNumber:____

Attest:________________________________Title_____________________

SEAL IF REQUIRED

Bidders Initials:_____

ATTACHMENT NUMBER 1

GENERAL CONDITIONS
(Bid Item #1)

Supervision:	Project Manager	$ ____________
	Project Superintendent	$ ____________
	Assistant Superintendent	$ ____________
	Project Engineer	$ ____________
	M & E Coordinator	$ ____________
	Job Accountant	$ ____________
Clerical:	Clerk/Secretary	$ ____________
	Timekeeper	$ ____________
Engineering		$ ____________
Messenger and Deliveries		$ ____________
Field Office		$ ____________
Field Office Equipment & Supplies		$ ____________
Prints, Supplies, Etc.		$ ____________
Janitorial & Maintenance		$ ____________
Dumpsters		$ ____________
Telephone		$ ____________
Utilities		$ ____________
Permits & Fees		$ ____________
Travel		$ ____________
Watchman		$ ____________
Job Meetings		$ ____________
Payroll Service		$ ____________
Storage		$ ____________
Fences, Walks & Bridges		$ ____________
Signs		$ ____________
Medical & Hospital		$ ____________
Safety Provisions		$ ____________
Temporary Services -	Light & Power	$ ____________
	Heat	$ ____________
	Water	$ ____________
	Toilets	$ ____________
	Protection, General	$ ____________
	Stairs & Rails	$ ____________
	Doors	$ ____________
	Windows	$ ____________
	Dust	$ ____________
	Noise	$ ____________
	Dewatering	$ ____________
Trucking		$ ____________
Fuel:	Gas & Oil	$ ____________
Cleaning:	General	$ ____________
	Final	$ ____________
Glass Cleaning & Breakage		$ ____________
Miscellaneous Damage Repair		$ ____________
Small Tools		$ ____________
Hoisting		$ ____________
SUBTOTAL GENERAL CONDITIONS		$ ____________

Bidders Initials:_____

ATTACHMENT NUMBER 1

GENERAL CONDITIONS
(Bid Item #1) (Cont'd)

SUBTOTAL GENERAL CONDITIONS (forward)	$ ________
Rigging	$ ________
Schedule	$ ________
Expediting	$ ________
Drinking Water	$ ________
Fire Protection	$ ________
Rentals	$ ________
Street Repairs	$ ________
Miscellaneous: Petty Cash	$ ________
Job Insurance	$ ________
Equal Employment	$ ________
Record Drawings	$ ________
Warranty/Guaranty Assembly Costs	$ ________
TOTAL VALUE OF GENERAL CONDITIONS	$ ________

Bidders Initials:_____

ATTACHMENT NUMBER 2

GENERAL CONSTRUCTION WORK BREAKDOWN

(Bid Item #2A)

03300 - Cast-in-Place Concrete	$ ________________
04200 - Unit Masonry	$ ________________
05120 - Structural Steel	$ ________________
05220 - Steel Joists	$ ________________
05310 - Steel Decking	$ ________________
05400 - Code Form Metal Framing	$ ________________
05500 - Metals Fabrications	$ ________________
06100/400 - Carpentry	$ ________________
06600 - Plastic Wall Panels	$ ________________
07160 - Bituminous Dampproofing	$ ________________
07175 - Water Repellents	$ ________________
07210 - Building Insulation	$ ________________
07241 - Exterior Insulation & Finish Systems Class PB	$ ________________
07250 - Sprayed-On Fireproofing	$ ________________
07270 - Firestopping	$ ________________
07530 - Single Ply Membrane Roofing	$ ________________
07600 - Flashing & Sheet Metal	$ ________________
07610 - Sheet Metal Roofing	$ ________________
07700/10 - Roof Specialties & Fascias	$ ________________
07900 - Joint Sealants	$ ________________
08100 - Standard Steel Doors & Frames	$ ________________
08200 - Wood Doors	$ ________________
08305 - Access Doors	$ ________________
08350 - Metal Bi-Fold Doors	$ ________________
08390 - Combination Storm & Steel Doors	$ ________________
08520 - Aluminum Windows	$ ________________
08710 - Door Hardware	$ ________________
08800 - Glass & Glazing	$ ________________
09250 - Gypsum Drywall	$ ________________
09262 - Gypsum Sheathing	$ ________________
09270 - Gypsum Board Shaft Wall Systems	$ ________________
09300 - Tile	$ ________________
09511 - Acoustical Panel Ceilings	$ ________________
09650 - Resilient Flooring & Accessories	$ ________________
09680 - Carpet	$ ________________
09900 - Painting	$ ________________
10200 - Louvers & Vents	$ ________________
10425 - Signs	$ ________________
10522 - Fire Extinguishers,Cabinets,& Accessories	$ ________________
10550 - Postal Specialties	$ ________________
10800 - Toilet & Bath Accessories	$ ________________
10916 - Closet Specialties	$ ________________
11170 - Solid Waste Handling Equipment	$ ________________
11450 - Residential Equipment Appliances	$ ________________
12372 - Kitchen & Bath Cabinets	$ ________________
12500 - Window Treatments	$ ________________
14210 - Electric Traction Elevators	$ ________________
14560 - Chutes	$ ________________
TOTAL VALUE OF GENERAL CONSTRUCTION WORK (2A)	$ ________________

Bidders Initials:_____

ATTACHMENT NUMBER 3

MECHANICAL AND ELECTRICAL WORK BREAKDOWN
(Bid Item #2B)

15400 - Plumbing	$ ______________
15500 - Fire Protection	$ ______________
15600 - Heating, Ventilating & Air Conditioning	$ ______________
16000 - Electrical Work	$ ______________
TOTAL VALUE OF MECHANICAL & ELECTRICAL WORK (Bid Item 2B)	$ ______________

SITE DEVELOPMENT/LAND BREAKDOWN
(Bid Item #2C)

02110 - Site Preparation	$ ______________
02160 - Excavation Support Systems	$ ______________
02200 - Earthwork	$ ______________
02220 - Handling Contaminated Soil	$ ______________
02350/56/57 - Foundation Piles & Testing	$ ______________
02511/15/20 - Paving & Surfacing	$ ______________
02600 - Water & Fire Service Piping	$ ______________
02700 - Sanitary & Storm Sewerage Systems	$ ______________
02830 - Chain Link Fencing & Gates	$ ______________
02900 - Landscape Work	$ ______________
TOTAL VALUE OF SITE DEVELOPMENT/ LAND BREAKDOWN (Bid Item #2C)	$ ______________

Bidders Initials:_____

ATTACHMENT NUMBER 4

SCHEDULE OF ALTERNATE PROPOSALS

In accordance with the terms and conditions of the Contract and the Proposal Form, the undersigned agrees to execute alternates selected for the sums set forth in the following schedule of Alternate Proposals in accordance with the general description outlined in Section 01030.

Alternate Number 1 - State the amount to be DELETED from the Base Bid for the substitution of sheet vinyl flooring and vinyl base at all unit bathrooms in lieu of ceramic tiles as specified in Section 01030 and as shown on the drawings.

DELETED____

____________________________________Dollars($______________)

Alternate Number 2 - State the amount to be DELETED from the Base Bid for the substitution of roller shades for horizontal blinds at all windows as specified in Section 01030.

DELETED____

____________________________________Dollars($______________)

Bidders Initials:_____

ATTACHMENT NUMBER 5

SCHEDULE OF UNIT PRICES

In accordance with the terms and conditions of the Contract and as part of the base proposal, the undersigned agrees to the following unit prices for designated work as described in Section 01025 which shall be considered as payment forms and not for purpose of determining contract award.

It shall be noted that work deducted from the basic contract covered by these stated unit prices will be DEDUCTED at the stated value LESS 15 percent.

Unit #1 - Excavation and disposal of contaminated soil at a Massachusetts Department of Environmental Protection (DEP) approved Massachusetts Sanitary Land Fill Site located within the Commonwealth of Massachusetts incorporating all ancillary costs as specified in Section 02220 . . . . $________/cu.yd.

Unit #2 - Purchase, deliver, place, and compact acceptable borrowed fill as specified in Section 02200 to replace removed contaminated soil . . . . $________/cu.yd.

Unit #3 - Furnish and install reinforced precast piles as specified in Section 02350 . . . . $________/ln.ft.

Unit #4 - Preaugering as required for reinforced precast piles as specified in Section 02350 . . . . $________/ln.ft.

Bidders Initials:_____

ATTACHMENT NUMBER 6

PROPOSED MANNING TABLE

Bidders Initials:_____

ATTACHMENT NUMBER 7

STAFFING AND PRINCIPAL SUBCONTRACTORS

Project Manager: ____

Project Superintendent(s): ______________________________________

____

(Attach biographies for each nominated employee)

Principal Subcontractors:

Excavator: ____

Concrete Contractor: ______________________________________

Masonry: ____

Carpentry & Drywall: ______________________________________

Structural Steel, Joists & Decking: _____________________________

Miscellaneous Metals: _____________________________________

Windows: ____

Hardware: ____

Resilient Flooring & Carpet: ________________________________

Painting: ____

Kitchen Cabinets: ____

Waste Disposal Equipment: __________________________________

Elevators: ____

Plumbing: ____

HVAC: ____

Fire Protection Systems: ___________________________________

Electrical Work: ____

Bidders Initials:_____

Exhibit 5

MHFA-2328 rev 1.0 10/6/86

MASSACHUSETTS HOUSING FINANCE AGENCY
CONTRACTOR'S AND/OR MORTGAGOR'S COST BREAKDOWN

Project name ______________________ MHFA Project No. ________
Project location ______________________ Date ________

BREAKDOWN BASED ON FOLLOWING:
Drawings & Specifications date:__________ Architect:__________________
Total building square footage: __________ ___0BR ___1BR ___2BR ___3BR ___4BR+
Construction start date: __________ Construction time: __________ Mo

Li	Dv	TRADE ITEM	TOTAL AMOUNT	TRADE DESCRIPTION
1	3	concrete		
2	4	masonry		
3	5	metals		
4	6	rough carpentry		
5	6	finish carpentry		
6	7	waterproofing		
7	7	insulation		
8	7	roofing		
9	7	sheet metal		
10	8	doors		
11	8	windows		
12	8	glass		
13	9	lath & plaster		
14	9	drywall		
15	9	tile work		
16	9	acoustical		
17	9	wood flooring		
18	9	resilient flooring		
19	9	paint & decorating		
20	10	specialties		
21	11	special equipment		
22	11	cabinets		
23	11	appliances		
24	12	blinds & shades		
25	12	carpet		
26	13	special construction		
27	14	elevators		
28	15	plumbing & hot water		
29	15	heat and ventilation		
30	15	air conditioning		
31	16	electrical		
32	Accessory Buildings			
33	Other/misc			
34	SUBTOTAL STRUCT(1 to 33)			
35	2	earth work		
36	2	site utilities		
37	2	roads & walks		
38	2	site improvement		
39	2	lawns & planting		
40	2	unusual site cond		
41	SUBTOTAL LAND(35 to 40)			
42	TOTAL IMPROVEMENTS(34+41)			
43	1	general conditions		
44	SUBTOTAL(42+43)			
45	1	builders overhead		
46	1	builders profit		
47	TOTAL AMOUNT(44+45+46)			

Mortgagor ______ ____________ **By** ____________ **Date** ________

Contractor ______ ____________ **By** ____________ **Date** ________

This breakdown represents the Contractor's and/or Mortgagor's estimate for costs and services to construct the above project on the above start date.

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and

(Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of
as Surety, hereinafter called the Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called the Obligee, in the sum of

Dollars ($),
for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

(Here insert full name, address and description of project)

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this day of 19

(Principal) *(Seal)*

(Witness)

(Title)

(Surety) *(Seal)*

(Witness)

(Title)

AIA Document A101

Standard Form of Agreement Between Owner and Contractor

where the basis of payment is a

STIPULATED SUM

1987 EDITION

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES; CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS COMPLETION OR MODIFICATION.

The 1987 Edition of AIA Document A201, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

This document has been approved and endorsed by The Associated General Contractors of America.

AGREEMENT

made as of the day of in the year of Nineteen Hundred and

BETWEEN the Owner:
(Name and address)

Oak Terrace Limited Partnership
c/o Asian Community Development Corporation
360-B Tremont Street
Boston, Massachusetts 02116

and the Contractor:
(Name and address)

The Project is:
(Name and location)

Oak Terrace Apartments
Washington and Oak Street
Boston, Massachusetts

The Architect is:
(Name and address)

Lawrence K.Cheng Associates
107 South Street, Suite 403
Boston, Massachusetts 02111

The Owner and Contractor agree as set forth below.

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ARTICLE 1
THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement; these form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2
THE WORK OF THIS CONTRACT

The Contractor shall execute the entire Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

See Rider 2A

ARTICLE 3
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

See Rider 2B

3.1 The date of commencement is the date from which the Contract Time of Paragraph 3.2 is measured, ~~and shall be the date of [illegible] different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.~~

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

Unless the date of commencement is established by a notice to proceed issued by the Owner, the Contractor shall notify the Owner in writing not less than five days before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

3.2 The Contractor shall achieve Substantial Completion of the entire Work not later than See Rider 2C

(Insert the calendar date or number of calendar days after the date of commencement. Also insert any requirements for earlier Substantial Completion of certain portions of the Work, if not stated elsewhere in the Contract Documents.)

~~[illegible] Time as provided in the Contract Documents~~

(Insert provisions, if any, for liquidated damages relating to failure to complete on time.)

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ARTICLE 4
CONTRACT SUM

4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of Dollars ($), subject to additions and deductions as provided in the Contract Documents.

4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner: None

(State the numbers or other identification of accepted alternates. If decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date until which that amount is valid.)

4.3 Unit prices, if any, are as follows:

N/A

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ARTICLE 5
PROGRESS PAYMENTS

5.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

5.3 Provided an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than days after the Architect receives the Application for Payment.

5.4 Each Application for Payment shall be based upon the schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

5.6 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

5.6.1. Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of Ten percent (10 %). Pending final determination of cost to the Owner of changes in the Work, amounts not in the dispute may be included as provided in Subparagraph 7.3.7 of the General Conditions even though the Contract Sum has not yet been adjusted by Change Order;

5.6.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of Ten percent (10 %); See Rider 4A

5.6.3 Subtract the aggregate of previous payments made by the Owner; and

5.6.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Paragraph 9.5 of the General Conditions.

5.7 The progress payment amount determined in accordance with Paragraph 5.6 shall be further modified under the following circumstances:

5.7.1 ~~Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to~~ See Rider 4B ~~percent (%) of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work and unsettled claims; and~~

5.7.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Subparagraph 9.10.3 of the General Conditions.

5.8 ~~Reduction or limitation of retainage, if any, shall be as follows~~:

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Subparagraphs 5.6.1 and 5.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

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ARTICLE 6
FINAL PAYMENT

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (1) the Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct nonconforming Work as provided in Subparagraph 12.2.2 of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

See Rider 5A

7.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

See Rider 5B

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision. Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.)

7.3 Other provisions:

None

ARTICLE 8
TERMINATION OR SUSPENSION

8.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of the General Conditions.

8.2 The Work may be suspended by the Owner as provided in Article 14 of the General Conditions.

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ARTICLE 9
ENUMERATION OF CONTRACT DOCUMENTS

9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

9.1.1 The Agreement is this executed Standard Form of Agreement Between Owner and Contractor, AIA Document A101, 1987 Edition.

9.1.2 The General Conditions are the General Conditions of the Contract for Construction, AIA Document A201, 1987 Edition.

9.1.3 The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated , and are as follows:

Document	**Title**	**Pages**
Supplemental General Conditions		

9.1.4 The Specifications are those contained in the Project Manual dated as in Subparagraph 9.1.3, and are as follows:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	**Title**	**Pages**
See Exhibit ______		

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9.1.5 The Drawings are as follows, and are dated unless a different date is shown below

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	**Title**	**Date**

See Exhibit ________

9.1.6 The addenda, if any, are as follows:

Number	**Date**	**Pages**

See Exhibit _______

Portions of addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

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9.1.7 Other documents, if any, forming part of the Contract Documents are as follows:

(List here any additional documents which are intended to form part of the Contract Documents. The General Conditions provide that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

1. The Contractor's Certificate of Prevailing Wages to MHFA, dated ______________________________.

2. The Minority Hiring Contract, dated October 2, 1990, between Owner, Contractor and MHFA.

3. MHFA Trade Payment breakdown.

4. Assignment of Construction Contract.

5. MHFA form of requisition and application for payment.

6. Schedule of Values attached hereto as Exhibit ______.

7. Special Conditions for MHFA attached hereto as Exhibit ______.

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER	CONTRACTOR
______________________________	______________________________
(Signature)	*(Signature)*
______________________________	______________________________
(Printed name and title)	*(Printed name and title)*

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RIDER TO STANDARD FROM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Rider 2A: The Work consists of the construction of an 88 unit apartment project with commercial space and associated improvements more particularly described in the Plans and Specifications.

Rider 2B: The date of commencement shall be fixed in a written Notice to Proceed from the Owner to the Contractor. Such notice shall be issued not later than __________ months after the date of this Agreement. Should the Owner fail to issue a Notice to Proceed as described herein, the Contractor may, at its option, cancel this Agreement and the parties hereto shall have no rights against each other, either in law or equity

Rider 2C: ______________ days after the date the Owner issues a Notice to Proceed to the Contractor, subject to adjustments of this Contract time as provided in the Contract Documents.

Time is of the essence of this Agreement. If Substantially Completion does not occur by the date specified in this Section 3.2 or by such date that the Contract Time may be extended, then the maximum sum stated in Article 4 below shall be reduced by $_____________ per day or the Contractor shall pay the Owner said sum, until Substantial Completion occurs.

Rider 4A: No materials stored on site and not yet installed may be claimed unless approved by the Massachusetts Housing Finance Agency ("MHFA").

Rider 4C: In no event shall more than ninety percent (90%) of the construction amount be advanced until final Punch List is agreed to by each of the Contractor, Owner and MHFA.

Rider 5A: 15 days after the date due

Rider 5B: The Prime Rate as published from time to time by The Wall Street Journal.

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A201

General Conditions of the Contract for Construction

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES. CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS MODIFICATION

1987 EDITION

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1

GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

* ~~The Contract Documents consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract~~. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include other documents such as bidding requirements (advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or portions of addenda relating to bidding requirements). *

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor, (2) between the Owner and a Subcontractor or Sub-subcontractor or (3) between any persons or entities other than the Owner and Contractor. ~~The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.~~

1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner or by separate contractors.

1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

~~1.1.7 THE PROJECT MANUAL~~

~~The Project Manual is the volume usually assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.~~

*

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed by the Owner and Contractor as provided in the Agreement. If either the Owner or Contractor or both do not sign all the Contract Documents, the Architect shall identify such unsigned Documents upon request.

1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor.* The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.2.4 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.2.5 Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

*

1.3 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.3.1 The Drawings, Specifications and other documents prepared by the Architect are instruments of the Architect's service through which the Work to be* executed by the Contractor is described. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them and will retain all common law, statutory and other reserved rights, in addition to the copyright. ~~All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work~~. The Drawings, Specifications and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the

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Work without the specific written consent of the Owner and Architect. The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this license shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect. Submittal or distribution to meet official regulatory * requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's copyright or other reserved rights.

1.4 CAPITALIZATION

1.4.1 Terms capitalized in these General Conditions include those which are (1) specifically defined, (2) the titles of numbered articles and identified references to Paragraphs, Subparagraphs and Clauses in the document or (3) the titles of other documents published by the American Institute of Architects.

1.5 INTERPRETATION

1.5.1 In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

ARTICLE 2

OWNER

2.1 DEFINITION

2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative.

2.1.2 The Owner upon reasonable written request shall furnish to the Contractor in writing information which is necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein at the time of execution of the Agreement and, within five days after any change, information of such change in title, recorded or unrecorded.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 The Owner shall, at the request of the Contractor, prior to execution of the Agreement ~~and promptly from time to time thereafter~~ furnish to the Contractor reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. ~~*(Note: Unless such reasonable evidence were furnished on request prior to the execution of the Agreement, the prospective contractor would not be required to execute the Agreement or to commence the Work.)*~~

* ~~**2.2.2** The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.~~

2.2.3 Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

2.2.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in orderly progress of the Work.

~~**2.2.5** Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary for execution of the Work.~~

*

2.2.6 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion) and Article 11 (Insurance and Bonds).

2.3 OWNER'S RIGHT TO STOP THE WORK

2.3.1 If the Contractor fails * to correct Work which is not in accordance with the requirements of the Contract Documents as required by Paragraph 12.2 or ~~persistently~~ fails * to carry out Work in accordance with the Contract Documents, the Owner, by written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

2.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may * ~~after such seven-day period give the Contractor a second written notice to correct such deficiencies within a second seven-day period. If the Contractor within such second seven-day period after receipt of such second notice fails to commence and continue to correct any deficiencies, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies.~~ In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's additional services and expenses made necessary by such default, neglect or failure. ~~Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect.~~ If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3

CONTRACTOR

3.1 DEFINITION

3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

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3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

~~**3.2.1** The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner pursuant to Subparagraph 2.2.2 and shall at once report to the Architect errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner or Architect for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor recognized such error, inconsistency or omission and knowingly failed to report it to the Architect. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Architect, the Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.~~

3.2.2 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Architect at once.

3.2.3 The Contractor shall perform the Work in accordance with the Contract Documents and submittals approved pursuant to Paragraph 3.12.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

3.3.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.

3.3.4 The Contractor shall be responsible for inspection of portions of Work already performed under this Contract to determine that such portions are in proper condition to receive subsequent Work.

3.4 LABOR AND MATERIALS

3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

3.4.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

3.5 WARRANTY

3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

3.6 TAXES

3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

3.7 PERMITS, FEES AND NOTICES

~~**3.7.1** Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required when bids are received or negotiations concluded.~~

3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities bearing on performance of the Work.

3.7.3 It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations. However, if the Contractor observes that portions of the Contract Documents are at variance therewith, the Contractor shall promptly notify the Architect and Owner in writing, and necessary changes shall be accomplished by appropriate Modification.

3.7.4 If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations ~~without such notice to the Architect and Owner~~, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs.

3.8 ALLOWANCES

3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against which the Contractor makes reasonable objection.

3.8.2 Unless otherwise provided in the Contract Documents:

.1 materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay in the Work;

.2 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

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.3 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances;

.4 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Clause 3.8.2.2 and (2) changes in Contractor's costs under Clause 3.8.2.3.

3.9 * SUPERINTENDENT

3.9.1 * ~~The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work~~. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

3.10.2 The Contractor shall prepare and keep current, for the Architect's approval, a schedule of submittals which is coordinated with the Contractor's construction schedule and allows the Architect reasonable time to review submittals.

3.10.3 The Contractor shall conform to the most recent schedules.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

3.11.1 The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, addenda, Change Orders and other Modifications, in good order and marked currently to record changes and selections made during construction, and in addition approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.12.1 ~~Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.~~ *

3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

3.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged. *

3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents. Review by the Architect is subject to the limitations of Subparagraph 4.2.7.

3.12.5 The Contractor shall review, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals made by the Contractor which are not required by the Contract Documents may be returned without action.

3.12.6 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect. Such Work shall be in accordance with approved submittals.

3.12.7 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. *

3.12.8 The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals.

3.12.10 Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents.

3.12.11 When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

* 3.13 USE OF SITE

3.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

* 3.14 CUTTING AND PATCHING

3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the

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Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

*

3.15 CLEANING UP

3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. *

3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.16 ACCESS TO WORK

3.16.1 The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

3.17 ROYALTIES AND PATENTS

3.17.1 The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

3.18 INDEMNIFICATION

3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property ~~(other than the Work itself)~~ including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions* of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 3.18.

3.18.2 In claims against any person or entity indemnified under this Paragraph 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Paragraph 3.18 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

3.18.3 The obligations of the Contractor under this Paragraph 3.18 shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, the Architect's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

*

ARTICLE 4

ADMINISTRATION OF THE CONTRACT

4.1 ARCHITECT

4.1.1 The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative.

4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

4.1.3 In case of termination of employment of the Architect, the Owner shall appoint an architect ~~against whom the Contractor makes no reasonable objection~~ and whose status under the Contract Documents shall be that of the former architect.

4.1.4 Disputes arising under Subparagraphs 4.1.2 and 4.1.3 shall be subject to arbitration.

4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents. ~~and will be the Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the correction period described in Paragraph 12.2~~. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with other provisions of the Contract.

4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. ~~However, the Architect will not be required to make exhaustive or continuous on-site inspections to check quality or quantity of the Work~~. On the basis of on-site observations as an architect, the Architect will keep the Owner informed of progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work.

4.2.3 ~~The Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility as provided in Paragraph 3.3.~~ The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Con

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tractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.2.4 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate through the Architect. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

4.2.5 Based on the Architect's observations and evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

4.2.6 The Architect will ~~have authority to~~ reject Work which does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable for implementation of the intent of the Contract Documents, the Architect will have authority to require additional inspection or testing of the Work in accordance with Subparagraphs 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made ~~in good faith~~ either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

4.2.7 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, ~~but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.~~ The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Paragraphs 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Paragraph 7.4.

4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion, will receive and forward to the Owner for the Owner's review and records written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of the Contract Documents.

4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

4.2.11 The Architect will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made with reasonable promptness and within any time limits agreed upon. ~~If no agreement is made concerning the time within which interpretations required of the Architect shall be furnished in compliance with this Paragraph 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until 15 days after written request is made for them.~~

4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.

4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

4.3 CLAIMS AND DISPUTES

4.3.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate Claims shall rest with the party making the Claim.

4.3.2 Decision of Architect. Claims, ~~including those~~ alleging an error or omission by the Architect, shall be referred initially to the Architect for action as provided in Paragraph 4.4. A decision by the Architect, as provided in Subparagraph 4.4.4, shall be required as a condition precedent to arbitration or litigation of a Claim between the Contractor and Owner as to all such matters arising prior to the date final payment is due, regardless of (1) whether such matters relate to execution and progress of the Work or (2) the extent to which the Work has been completed. The decision by the Architect in response to a Claim shall not be a condition precedent to arbitration or litigation in the event (1) the position of Architect is vacant, (2) the Architect has not received evidence or has failed to render a decision within agreed time limits, (3) the Architect has failed to take action required under Subparagraph 4.4.4 within 30 days after the Claim is made, (4) 45 days have passed after the Claim has been referred to the Architect or (5) the Claim relates to a mechanic's lien.

4.3.3 Time Limits on Claims. Claims by either party must be made within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made by written notice. An additional Claim made after the initial Claim has been implemented by Change Order will not be considered unless submitted in a timely manner.

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4.3.4 Continuing Contract Performance. Pending final resolution of a Claim including arbitration, unless otherwise agreed in writing the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents

4.3.5 Waiver of Claims: Final Payment. The making of final payment shall constitute a waiver of Claims by the Owner except those arising from:

.1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;

.2 failure of the Work to comply with the requirements of the Contract Documents; or

.3 terms of special warranties required by the Contract Documents.

4.3.6 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are ~~(1)~~ subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents ~~or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents~~, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract Time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 4.4.

4.3.7 Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.3. If the Contractor believes additional cost is involved for reasons including but not limited to (1) a written interpretation from the Architect, (2) an order by the Owner to stop the Work where the Contractor was not at fault, (3) a written order for a minor change in the Work issued by the Architect, (4) failure of payment by the Owner, (5) termination of the Contract by the Owner, (6) Owner's suspension or (7) other reasonable grounds, Claim shall be filed in accordance with the procedure established herein.

4.3.8 Claims for Additional Time

4.3.8.1 If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

4.3.8.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time ~~and could not have been reasonably anticipated~~, and that weather conditions had an adverse effect on the scheduled construction.

4.3.9 Injury or Damage to Person or Property. If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, of any of the other party's employees or agents, or of others for whose acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. If a Claim for additional cost or time related to this Claim is to be asserted, it shall be filed as provided in Subparagraphs 4.3.7 or 4.3.8.

4.4 RESOLUTION OF CLAIMS AND DISPUTES

4.4.1 The Architect will review Claims and take one or more of the following preliminary actions within ten days of receipt of a Claim: (1) request additional supporting data from the claimant, (2) submit a schedule to the parties indicating when the Architect expects to take action, (3) reject the Claim in whole or in part, stating reasons for rejection, (4) recommend approval of the Claim by the other party or (5) suggest a compromise. The Architect may also, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim.

4.4.2 If a Claim has been resolved, the Architect will prepare or obtain appropriate documentation.

4.4.3 If a Claim has not been resolved, the party making the Claim shall, within ten days after the Architect's preliminary response, take one or more of the following actions: (1) submit additional supporting data requested by the Architect, (2) modify the initial Claim or (3) notify the Architect that the initial Claim stands.

4.4.4 If a Claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect, the Architect will notify the parties in writing that the Architect's decision will be made within seven days, which decision shall be final and binding on the parties but subject to arbitration. Upon expiration of such time period, the Architect will render to the parties the Architect's written decision relative to the Claim, including any change in the Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Architect may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

4.5 ARBITRATION

4.5.1 Controversies and Claims Subject to Arbitration. Any controversy or Claim arising out of or related to the Contract, or the breach thereof, shall be settled by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator or arbitrators may be entered in any court having jurisdiction thereof, except controversies or Claims relating to aesthetic effect and except those waived as provided for in Subparagraph 4.3.5. Such controversies or Claims upon which the Architect has given notice and rendered a decision as provided in Subparagraph 4.4.4 shall be subject to arbitration upon written demand of either party. Arbitration may be commenced when 45 days have passed after a Claim has been referred to the Architect as provided in Paragraph 4.3 and no decision has been rendered.

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4.5.2 Rules and Notices for Arbitration. Claims between the Owner and Contractor not resolved under Paragraph 4.4 shall, if subject to arbitration under Subparagraph 4.5.1, be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect, unless the parties mutually agree otherwise. Notice of demand for arbitration shall be filed in writing with the other party to the Agreement between the Owner and Contractor and with the American Arbitration Association, and a copy shall be filed with the Architect. *

4.5.3 Contract Performance During Arbitration. During arbitration proceedings, the Owner and Contractor shall comply with Subparagraph 4.3.4.

4.5.4 When Arbitration May Be Demanded. Demand for arbitration of any Claim may not be made until the earlier of (1) the date on which the Architect has rendered a final written decision on the Claim, (2) the tenth day after the parties have presented evidence to the Architect or have been given reasonable opportunity to do so, if the Architect has not rendered a final written decision by that date, or (3) any of the five events described in Subparagraph 4.3.2.

4.5.4.1 When a written decision of the Architect states that (1) the decision is final but subject to arbitration and (2) a demand for arbitration of a Claim covered by such decision must be made within 30 days after the date on which the party making the demand receives the final written decision, then failure to demand arbitration within said 30 days' period shall result in the Architect's decision becoming final and binding upon the Owner and Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence, but shall not supersede arbitration proceedings unless the decision is acceptable to all parties concerned.

4.5.4.2 A demand for arbitration shall be made within the time limits specified in Subparagraphs 4.5.1 and 4.5.4 and Clause 4.5.4.1 as applicable, and in other cases within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations as determined pursuant to Paragraph 13.7.

~~**4.5.5 Limitation on Consolidation or Joinder.** No arbitration arising out of or relating to the Contract Documents shall include, by consolidation or joinder or in any other manner, the Architect, the Architect's employees or consultants, except by written consent containing specific reference to the Agreement and signed by the Architect, Owner, Contractor and any other person or entity sought to be joined. No arbitration shall include, by consolidation or joinder or in any other manner, parties other than the Owner, Contractor, a separate contractor as described in Article 6 and other persons substantially involved in a common question of fact or law whose presence is required if complete relief is to be accorded in arbitration. No person or entity other than the Owner, Contractor or a separate contractor as described in Article 6 shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a dispute not described therein or with a person or entity not named or described therein. The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.~~

4.5.6 Claims and Timely Assertion of Claims. A party who files a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded. When a party fails to include a Claim through oversight, inadvertence or excusable neglect, or when a Claim has matured or been acquired subsequently, the arbitrator or arbitrators may permit amendment.

4.5.7 Judgment on Final Award. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITIONS

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. *

5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection. *

5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. The Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued. However, no increase in the Contract Sum shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

5.2.4 The Contractor shall not change a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such change.

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5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By appropriate agreement, ~~written where legally required for validity,~~ the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner ~~and Architect~~ under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. ~~Where appropriate,~~ the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, ~~and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents.~~ Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

* 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Paragraph 14.2 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

5.4.2 If the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted.

ARTICLE 6

CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided elsewhere in the Contract Documents.

6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule and Contract Sum deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights which apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

6.2.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor.

6.2.4 The Contractor shall promptly remedy damage ~~wrongfully~~ caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors as provided in Subparagraph 10.2.5.

6.2.5 Claims and other disputes and matters in question between the Contractor and a separate contractor shall be subject to the provisions of Paragraph 4.3 provided the separate contractor has reciprocal obligations.

6.2.6 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Paragraph 3.14.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Paragraph 3.15, the Owner may clean up and allocate the cost among those responsible as the Architect determines to be just.

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ARTICLE 7

CHANGES IN THE WORK

7.1 CHANGES

7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

7.1.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a proposed Change Order or Construction Change Directive that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

7.2 CHANGE ORDERS

7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect, stating their agreement upon all of the following:

- **.1** a change in the Work;
- **.2** the amount of the adjustment in the Contract Sum, if any; and
- **.3** the extent of the adjustment in the Contract Time, if any.

7.2.2 Methods used in determining adjustments to the Contract Sum may include those listed in Subparagraph 7.3.3.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:*

- **.1** mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee;*or
- **.4** as provided in Subparagraph 7.3.6.

7.3.4 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

7.3.5 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

7.3.6 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Clause 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Subparagraph 7.3.6 shall be limited to the following:

- **.1** costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' or workmen's compensation insurance;
- **.2** costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- **.3** rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- **.4** costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- **.5** additional costs of supervision and field office personnel directly attributable to the change.

7.3.7 Pending final determination of cost to the Owner, amounts not in dispute may be included in Applications for Payment. The amount of credit to be allowed by the Contractor to the Owner for a deletion or change which results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

7.3.8 If the Owner and Contractor do not agree with the adjustment in Contract Time or the method for determining it, the adjustment or the method shall be referred to the Architect for determination.

7.3.9 When the Owner and Contractor agree with the determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.

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7.4 MINOR CHANGES IN THE WORK

7.4.1 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 ~~Unless otherwise provided,~~ Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

8.1.2 The date of commencement of the Work is the date established in the Agreement. The date shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Paragraph 9.8.

8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

8.2 PROGRESS AND COMPLETION

8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance. Unless the date of commencement is established by a notice to proceed given by the Owner, the Contractor shall notify the Owner in writing not less than five days or other agreed period before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

~~**8.3.1** If the Contractor is delayed at any time in progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control, or by delay authorized by the Owner pending arbitration, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.~~

8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Paragraph 4.3.

8.3.3 This Paragraph 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

~~9.2 SCHEDULE OF VALUES~~

~~**9.2.1** Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.~~

9.3 APPLICATIONS FOR PAYMENT

9.3.1 ~~At least ten days before the date established for each progress payment,~~ the Contractor shall submit to the Architect an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for elsewhere in the Contract Documents.

9.3.1.1 Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives but not yet included in Change Orders.

9.3.1.2 Such applications may not include requests for payment of amounts the Contractor does not intend to pay to a Subcontractor or material supplier because of a dispute or other reason.

9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

9.4 CERTIFICATES FOR PAYMENT

~~**9.4.1** The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the~~

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~~Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1~~

*

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's observations at the site and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.1 The Architect * ~~may~~ decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Subparagraph 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Subparagraph 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect * ~~may~~ also decide not to certify payment or, because of subsequently discovered evidence or subsequent observations, * ~~may~~ nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss because of:

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence * that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or another contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** ~~persistent~~ failure to carry out the Work in accordance with the Contract Documents *

9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

9.6 PROGRESS PAYMENTS

9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

9.6.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in similar manner.

9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

9.6.4 Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

9.6.5 Payment to material suppliers shall be treated in a manner similar to that provided in Subparagraphs 9.6.2, 9.6.3 and 9.6.4.

9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

9.7 FAILURE OF PAYMENT

9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be accomplished as provided in Article 7.

9.8 SUBSTANTIAL COMPLETION

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use *

9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected. The Contractor shall proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or desig-

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nated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. The Contractor shall then submit a request for another inspection by the Architect to determine ~~Substantial~~ Completion. When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion which shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.*

9.8.3 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

9.9 PARTIAL OCCUPANCY OR USE

9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Subparagraph 11.3.11 and authorized by public authorities having jurisdiction over the Work. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.*

9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Subparagraph 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be cancelled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims. The making of final payment shall constitute a waiver of claims by the Owner as provided in Subparagraph 4.3.5.

9.10.4 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment. Such waivers shall be in addition to the waiver described in Subparagraph 4.3.5.

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ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

10.1.2 In the event the Contractor encounters on the site material reasonably believed to be asbestos or polychlorinated biphenyl (PCB) which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and Architect in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Owner and Contractor if in fact the material is asbestos or polychlorinated biphenyl (PCB) and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB), or when it has been rendered harmless, by written agreement of the Owner and Contractor, or in accordance with final determination by the Architect on which arbitration has not been demanded, or by arbitration under Article 4.

10.1.3 The Contractor shall not be required pursuant to Article 7 to perform without consent any Work relating to asbestos or polychlorinated biphenyl (PCB).

10.1.4 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material is asbestos or polychlorinated biphenyl (PCB) and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Owner, anyone directly or indirectly employed by the Owner or anyone for whose acts the Owner may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Subparagraph 10.1.4.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. *

10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.

10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

10.2.7 The Contractor shall not load or permit any part of the construction or site to be loaded so as to endanger its safety.

10.3 EMERGENCIES

10.3.1 In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Paragraph 4.3 and Article 7.

ARTICLE 11

INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase from and maintain * in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed;

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.2 claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

.4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and

.7 claims involving contractual liability insurance applicable to the Contractor's obligations under Paragraph 3.18.

11.1.2 * ~~The insurance required by Subparagraph 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.~~

11.1.3 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates and the insurance policies required by this Paragraph 11.1 shall contain a provision that coverages afforded under the policies will not be cancelled or allowed to expire until at least * ~~30~~ days' prior written notice has been given to the Owner. If any of the foregoing insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment as required by Subparagraph 9.10.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

11.3 PROPERTY INSURANCE

11.3.1 ~~Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance in the amount of the initial Contract Sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.3 to be covered, whichever is earlier. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.~~

11.3.1.1 Property insurance shall be on an all-risk policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, falsework, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's services and expenses required as a result of such insured loss. Coverage for other perils shall not be required unless otherwise provided in the Contract Documents.

11.3.1.2 ~~If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor, then the Owner shall bear all reasonable costs properly attributable thereto.~~

11.3.1.3 If the property insurance requires minimum deductibles and such deductibles are identified in the Contract Documents, the Contractor shall pay costs not covered because of such deductibles. If the Owner or insurer increases the required minimum deductibles above the amounts so identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increased or voluntary deductibles. If deductibles are not identified in the Contract Documents, the Owner shall pay costs not covered because of deductibles.

11.3.1.4 Unless otherwise provided in the Contract Documents, this property insurance shall cover portions of the Work stored off the site after written approval of the Owner at the value established in the approval, and also portions of the Work in transit.

11.3.2 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

11.3.3 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. ~~The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.~~

11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or for other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

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11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Subparagraph 11.3.7 for damages caused by fire or other perils covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Paragraph 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be cancelled or allowed to expire until at least 30 days' prior written notice has been given to the Contractor.

11.3.7 Waivers of Subrogation. The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this Paragraph 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

11.3.8 A loss insured under Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Subparagraph 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

11.3.9 ~~If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or in accordance with an arbitration award in which case the procedure shall be as provided in Paragraph 4.5. If after such loss no other special agreement is made, replacement of damaged property shall be covered by appropriate Change Order.~~

11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers~~, unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection be made, arbitrators shall be chosen as provided in Paragraph 4.5. The Owner as fiduciary shall, in that case, make settlement with insurers in accordance with directions of such arbitrators. If distribution of insurance proceeds by arbitration is required, the arbitrators will direct such distribution~~.

11.3.11 Partial occupancy or use in accordance with Paragraph 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

11.4 PERFORMANCE BOND AND PAYMENT BOND

~~**11.4.1** The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.~~

~~**11.4.2** Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.~~

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.1 UNCOVERING OF WORK

12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for the Architect's observation and be replaced at the Contractor's expense without change in the Contract Time.

12.1.2 If a portion of the Work has been covered which the Architect has not specifically requested to observe prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work is not in accordance with the Contract Documents, the Contractor shall pay such costs unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

12.2 CORRECTION OF WORK

12.2.1 ~~The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby.~~

12.2.2 If, within one year after the date of ~~Substantial~~ Completion of the Work or designated portion thereof, or after the date

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for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. ~~This period of one year shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.~~ This obligation under this Subparagraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

12.2.3 The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

12.2.4 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 2.4. If the Contractor does not proceed with correction of such nonconforming Work ~~within a reasonable time fixed by written notice from the Architect~~, the Owner may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten days after written notice, the Owner may upon ten additional days' written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

12.2.5 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

12.2.6 Nothing contained in this Paragraph 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in Subparagraph 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.3 ACCEPTANCE OF NONCONFORMING WORK

12.3.1 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

13.1.1 The Contract shall be governed by the law of the place where the Project is located.

13.2 SUCCESSORS AND ASSIGNS

13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to partners, successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

13.3 WRITTEN NOTICE

13.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or a member of the firm or entity or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified mail to the last business address known to the party giving notice.

13.4 RIGHTS AND REMEDIES

13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed in writing.

13.5 TESTS AND INSPECTIONS

13.5.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so the Architect may observe such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Subparagraph 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so the Architect may observe such procedures.

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The Owner shall bear such costs except as provided in Subparagraph 13.5.3.

13.5.3 If such procedures for testing, inspection or approval under Subparagraphs 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses.

13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

~~13.6 INTEREST~~

~~**13.6.1** Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.~~

13.7 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

13.7.1 As between the Owner and Contractor:

- .1 **Before Substantial Completion.** As to acts or failures to act occurring prior to the relevant date of Substantial Completion, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than such date of Substantial Completion;
- .2 **Between Substantial Completion and Final Certificate for Payment.** As to acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of issuance of the final Certificate for Payment; and
- .3 **After Final Certificate for Payment.** As to acts or failures to act occurring after the relevant date of issuance of the final Certificate for Payment, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued in any and all events not later than the date of any act or failure to act by the Contractor pursuant to any warranty provided under Paragraph 3.5, the date of any correction of the Work or failure to correct the Work by the Contractor under Paragraph 12.2, or the date of actual commission of any other act or failure to perform any duty or obligation by the Contractor or Owner, whichever occurs last.

ARTICLE 14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of ~~30~~ days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor, for any of the following reasons:

- .1 issuance of an order of a court or other public authority having jurisdiction;
- .2 an act of government, such as a declaration of national emergency, making material unavailable;
- .3 because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Subparagraph 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents;
- .4 if repeated suspensions, delays or interruptions by the Owner as described in Paragraph 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less; or
- .5 the Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Subparagraph 2.2.1.

14.1.2 If one of the above reasons exists, the Contractor may, upon seven additional days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages.

14.1.3 If the Work is stopped for a period of 60 days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Subparagraph 14.1.2.

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 ~~The Owner may terminate the Contract if the Contractor:~~

- ~~.1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;~~
- ~~.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;~~
- ~~.3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or~~
- ~~.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.~~

14.2.2 When any of the above reasons exist, the Owner ~~upon certification by the Architect that sufficient cause exists to jus-~~

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~~tify such action,~~ may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 accept assignment of subcontracts pursuant to Paragraph 5.4; and

.3 finish the Work by whatever reasonable method the Owner may deem expedient.

14.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, * such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract. *

14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.3.2 An adjustment shall be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance, caused by suspension, delay or interruption. No adjustment shall be made to the extent:

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

14.3.3 Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

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SUPPLEMENTAL GENERAL CONDITIONS
Modifying AIA A201 (1987 Edition)

Regarding
Oak Terrace Project

The "General Conditions of the. Contract for Construction," AIA Document A-201, Fourteenth Edition, Articles 1 through 15 inclusive are a part of this Contract. The following supplements modify, delete and/or add to th General Conditions. Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph or subparagraph hall remain in effect and the supplemental provisions shall be considered as added thereto. Where any article, paragraph or subparagraph in the General Conditions is amended, voided or superseded by any of the following paragraphs, the provisions of such article, paragraph or subparagraph not so amended, voided or superseded shall remain in effect. Unless otherwise quoted, provisions below which do not correspond to an existing provision of the General Conditions are to be inserted in the order indicated.

Article 1: Contract Documents

1.1.1 Delete the first sentence and replace with the following:

The Contract Documents shall consist of the Agreement between Owner and Contractor (hereinafter the "Agreement"), all items enumerated as Contract Documents therein, and all Modifications issued after execution of Agreement.

Add the following at the end of subparagraph 1.1.1:

In the event of a conflict among the Contract Documents, the Contract Documents shall be construed according to the following priorities:

First Priority:	Modifications (with later date having greater priority)
Second Priority:	Agreement with Exhibits
Third Priority:	Supplementary General Conditions
Fourth Priority:	General Conditions of the Contract for Construction

Fifth Priority:	Addenda to Specifications or Drawings (with later date having greater priority)
Sixth Priority:	Specifications
Seventh Priority:	Drawings (sometimes called Plans)

In drawings, large scale details shall govern small scale drawings. All indications or notations which apply to one of a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents. In case of conflicts between drawings and specifications, or within either of the documents themselves, the work shall be done by the method of highest quality and greatest expense, unless otherwise specifically directed by the Architect upon request for interpretation by the Contractor.

1.1.8 (insert) 1 1.8 The Drawings are diagrammatic only, and are not intended to show how the exact physical locations or configurations of work. Such work shall be installed to clear all obstructions, permit proper clearances for the work of other trades, and present an orderly appearance where exposed. Exact locations of fixtures and outlets shall be obtained from the Architect as provided in subparagraphs 3.2.1 and 3.2.2 before the Work is roughed in, defective work installed without such information from the Architect shall be relocated at the Contractor's expense.

1.2.3 Insert the following before the last sentence:

The Architect may, as he or she deems desirable, issue additional drawings or instructions indicating in greater detail the construction or design of the various parts of the Work reasonably inferable from the Contract Documents; such drawings or instructions may be effected by notice to the Contractor without contemporaneous agreements for any modification of the Contract Time or Contract Sum. If the Contractor claims additional cost or delay on account of such additional drawings or instructions, it shall give notice as provided in subparagraph 4.3 7.

1.2.6 (insert) 1.2.6 The Contractor must carefully inspect the site to fully understand the existing conditions and intent of the Contract Documents. Owner agrees to allow Contractor access to the site prior to giving the Notice to Proceed so that Contractor may conduct examinations and tests to ascertain the conditions of the site. No claim for extra compensation or extension of time will be allowed on account of the Contractor's failure to estimate properly the quantities, materials, location, and measurements of all items required to complete the Work.

1.2.7 (insert) 1 2.7 Where codes, standards, requirements and publications of public and private bodies are referred to in the Specifications, references shall be understood to be to the latest revision prior to the date of receiving bids, except where otherwise indicated.

1.2.8 (insert) 1.2.8 Where no explicit quality or standards for materials or workmanship are established for work, such work is to be of high quality for the intended use and consistent with the quality of the construction of the Project generally.

1.2.9 (insert) 1.2.9 All manufactured articles, materials, and equipment shall be applied. installed, connected, erected, and used, in accordance with the manufacturer's written or printed directions and instructions unless otherwise indicated in the Contract Documents.

1.2.10 The Mechanical, Electrical and Fire Protection Drawings are diagrammatic only, and are not intended to show the alignment, physical locations or configurations of such Work. Such Work shall be installed without additional cost to the Owner to clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. Prior to beginning such Work, the Contractor shall prepare coordination drawings showing the exact alignment, physical location and configuration of the Mechanical, Electrical and Fire Protection installations and demonstrating to the Contractor's satisfaction that the installations will comply with the preceding sentence.

1.3.1 Insert "Owner and each of Owner's lenders" after "Contractor" in line 4. Insert "or lender" after "regulatory" in line 30.

Article 2: Owner

2.2.1 Delete sentence in brackets and delete the words "and promptly from time to time thereafter" from the second and third lines..

2.2.2 Delete entirely and insert the following:

2.2.2 The Owner shall furnish to the Contractor any information available to Owner concerning the location or limits of utilities on or adjacent to the Project site, a perimeter boundary survey of the Project site, and a legal description of the Project site. The Contractor is solely responsible for identifying and verifying the precise location of utilities on or adjacent to the Project site and the accuracy of the survey. The Contract shall promptly notify Owner in writing of any inaccuracies or modifications which may be required.

2.2.5 Delete entirely and insert the following:

2.2.5 Unless otherwise provided in the Contract Documents, the Contractor shall be furnished free of charge one (1) reproducible set of all Contract Documents. The Contractor's cost of reproducing, for use by the Subcontractors all copies of the Contract Documents reasonably necessary for the execution of the Work shall be included in the Contract Sum.

2 3.1 Delete "persistently" in the third line. Insert the words "in Owner's judgment" after the word "fails" in the first line and after the word "fails" in the third line.

2.4.1 Insert ", without prejudice to other remedies the Owner may have, commence and continue to carry out the work" in line 8 at the end of the first sentence.

Article 3: Contractor

3.2.1 Delete entirely and insert the following:

3.2.1 The Contractor represents that it has carefully inspected the site constituting the Project and has carefully studied and compared the Agreement, General Conditions of the Contract, Drawings, Specifications and other Contract Documents and agrees that such documents appear, to the best of its knowledge as an experienced contractor, to contain all items necessary for the construction of the Project in accordance with good and generally accepted construction practices as well as with current building and similar codes. The Contractor shall promptly notify Architect and Owner in writing of all errors, omissions, inconsistencies or other problems it may discover immediately upon discovery and before beginning the Work. All costs and delays caused by the failure of Contractor to promptly report such matters shall be borne by Contractor. Upon the receipt of any Change Order, the Contractor shall carefully study and compare the Drawings and Specifications as they relate to the work requested, and shall report to Architect and Owner any conflicts with current building and similar codes or inconsistencies with other Project Documents.

3.2.4 (insert) 3.2.4 The Contractor shall give the Architect at least five working days notice of any additional design drawings, specifications or instructions required to define the Work in greater detail, or to permit the proper progress of the Work.

3.2.5 (insert) 3.2.5 The Contractor shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but shall request additional drawings or instructions from the Architect as provided in subparagraph 4.2.4. If the Contractor proceeds with such Work without obtaining further drawings or instructions it shall correct Work incorrectly done at its own expense and shall be liable to the Owner for the other damages resulting from incorrectly proceeding with the Work.

3.3.2 Insert the words "or supplying" before the word "portions" on the fourth line.

3.3.5 (insert) 3.3.5 The Contractor shall cooperate with the Architect and all Subcontractors in maintaining the orderly and continuous progress of the Work, and shall give all proper and customary facilities to all trades.

3.3.6 (insert) 3.3.6 The Contractor shall attend weekly job meetings (and such other meetings as may be requested from time to time) with the Architect and such other persons as the Architect may from time to time wish to have present. The Contractor shall be represented by a principal, project manager, general superintendent or other authorized main office representative if requested by the Owner or Architect, as well as by its own superintendent. An authorized representative of any subcontractor or sub-subcontractor shall attend such meetings if the presence of such representative is requested by the Architect. Such representatives shall be empowered to make binding commitments on all matters to be discussed at such meetings, including costs, payments, change orders, time schedules, and manpower. Any notices required under the Contract may be served on such representatives.

3.4.3 (insert) 3.4.3 All work shall be applied and installed by workmen skilled and experienced in their respective trades, using proper tools and equipment.

3.4.4 (insert) 3.4.4 During the course of construction, from the time the site is delivered to the Contractor until Substantial Completion, the Contractor shall make all necessary arrangements, including paying for all services for temporary water, heat and electrical power needed for the timely and proper completion of the Work by the Contractor and all of its Subcontractors.

3.5.2 (insert) 3.5.2 If the Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, it shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for approval, and shall request written approval of the deviation from the requirements of the Contract Documents. The Owner and Architect will not approve as equal to materials specified proposed substitutes which, in their opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality or design of the Work.

3.5.3 (insert) 3.5.3 Any additional cost or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner or Architect, unless such substitution was made at the written request or direction of the Owner or the Architect, or was due to a change order required by public authority or unforeseen conditions as set forth in Article 4.

3.5.4 (insert) 3.5.4 The warranty provided in this Paragraph 3.5 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

3.5.5 (insert) 3.5.5 The Contractor shall procure and deliver to the Architect for transmittal to the Owner no later than the date claimed by the Contractor as the date of Substantial Completion, bound together with a Table of Contents thereto, one set of all warranties required by the Contract Documents or applicable to the Work, endorsed by the Contractor, required by the Contract Documents. Delivery of the same by the Contractor shall constitute the Contractor's guarantee to the

Owner that the warranty(s) conform to the Contract Documents and that the Contractor has performed the Work in accordance with the manufacturer's written instructions. Whenever in the Specifications, Contractor is to comply with manufacturer's instructions "except as otherwise indicated" or "except to the extent more stringent requirements are indicated" or "except as manufacturer's representative shall otherwise indicate" or some similar exception, Contractor shall identify and describe in detail, in writing, the exception followed and a copy thereof, signed by the Contractor and if relevant, the manufacturer, shall be sent to the Architect.

3.5.6 (insert) 3.5.6 The Contractor shall be responsible for all broken, scratched or cracked glass, regardless of how caused, and for all other damage to the Project unless such damage can be shown not to have been caused by the Contractor, its subcontractors or suppliers.

3.7.1 Delete entirely and substitute the following:

3.7.1 The Contractor shall secure and pay for the street excavation permits, all utility company permits and fees, and all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work and lawful use and occupancy of the Project.

3.7.2 Insert line 2 after the word "regulations" the words "and permit conditions".

3.9.1 Delete the first sentence of subparagraph 3.9.1 and substitute the following:

The Contractor shall employ a competent superintendent who shall be approved by the Owner. The superintendent shall be in attendance at the Project site full time during the progress of the Work until the date of Substantial Completion, and for such additional time thereafter as may be necessary for the expeditious completion of the Work.

3.9.2 (insert) 3.9.2 The Contractor, at its expense, shall properly verify existing conditions of the site's grades, lines, elevations, levels, column, wall and partition lines required in laying out the Work. The Contractor shall compare all grades, lines, levels and dimensions as shown on the drawings with actual site conditions, and shall promptly report to the Architect, before commencing work, any inconsistencies it may discover.

3.9.3 (insert) 3.9.3 The Contractor shall coordinate and supervise the work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work.

3.11.2 (insert) 3.11.2 The Architect may periodically inspect the record drawings at the site. The proper and current maintenance of the information required on these drawings shall be a condition precedent to approval of requisitions for periodic payment.

3.12.1 Delete entirely and substitute the following:

Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, and other data which are prepared by the Contractor, manufacturer, supplier, or distributor, and which illustrate some portion of the work. Printed brochures will not be accepted as a substitute for shop drawings, although they may be required separately or in addition to shop drawings. Shop drawings shall be submitted by Contractor in form of one reproducible sepia transparency and one blackline print per drawing and on printed brochure in packets of 3 copies each. In each case submittal shall be accompanied by a transmittal form describing the submittal. The Architect's criticisms and comments shall be made on the sepia copy which shall be returned to the Contractor. If resubmission is required by the Architect, the Contractor shall then promptly make the necessary corrections on the original drawing and resubmit a sepia transparency copy of the corrected drawing. Approval of shop drawings by the Architect and/or engineer is for general conformance to the Contract Documents and does not represent approval of dimensions, quantities, or methods of installation. The Contract Documents remain the controlling factor in case of disputes over installed items or work and the Contractor shall replace any item or work which does not conform to the Contract Documents at its own expense.

3.12.3 Add the following at the end:

Samples shall be submitted in duplicate unless otherwise specified or directed by the Architect. Each sample shall be clearly labeled as to its material, type or make, manufacturer, size or gauge, and other pertinent data as approved or directed by Architect.

3.12.7 Add the following sentence at the end:

The Contractor shall indicate this verification and approval of Shop Drawings submitted by a subcontractor by stamping all copies of the Shop Drawings prior to submittal to the Architect. Shop Drawings submitted without the Contractor's stamp may be returned for re-submittal.

3.12.12 (insert) 3.12.12 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Architect's approval a schedule of Shop Drawings, printed brochures, and samples required to be submitted for the work. The schedule shall indicate by trade the date by which each such items is to be submitted and the date by which final approval of each item must be obtained, and shall be revised as required by conditions of the work, subject to Architect's approval. In each case reasonable time must be permitted for Architect's review and for possible resubmittals. Submission of Shop Drawings, printed brochures, and samples shall reasonably conform to the approved schedule.

3.13.2 (insert) 3.13.2 The Contractor shall be responsible for obtaining all necessary easements or permits for construction staging and for any use of public sidewalks or streets from the City of Boston or others, as necessary and for making arrangements for parking for persons working on the site and for furnishing and maintaining in a safe condition all barricades, temporary enclosures, railings and lights and all other safety protection measures required by its obligation to protect the occupants and their visitors of the Project and by traffic, municipal and state safety regulations, and for removing the same on completion of the job.

3.13.3 (insert) 3.13.3 All Work carried on outside of regular working hours shall be done at the Contractor's expense, and no extras will be allowed. The use of "overtime" shall be at the Contractor's sole and option and expense except as requested expressly by Owner in writing.

3.13.4 (insert) 3.13.4 The Contractor shall confine its apparatus, storage of materials as required by the Architect or the Owner, and as required by standards of good care, and shall not unreasonably encumber the site with its materials. The Contractor shall keep the corridors and exits clear of debris, materials, etc. at all times, to provide for normal and fire egress from all buildings. The site shall be maintained in a safe, orderly condition at all times.

The Contractor shall take the following precautions to protect and secure the Project and building materials:

(a) The Contractor shall maintain the areas of the site and buildings where the Work is in progress rubbish-free, and shall provide metal barrels into which all construction or Work-related refuse shall be deposited. All such barrels shall have tight-fitting covers.

(b) The Contractor and Subcontractors shall store materials so they do not create natural pockets for papers or other combustible materials.

(c) When materials with combustible covers are stored on the site during construction, they shall be located within easy reach of fire protection equipment.

(d) An approved number of fire extinguishers shall be placed throughout the work areas, temporary paint shop and within easy reach of mechanics who are operating plumbers' furnaces, burning or welding apparatus. The number and location shall be approved from time to time by the local fire department, if so required.

(e) Every precaution shall be taken to see that all building materials and equipment and all parts of the buildings under construction are properly braced and secured against winds protected from injury by water, fire, accident or other cause during work hours and non-working hours.

(f) The Contractor shall provide weather-tight and secure enclosures for all exterior openings in the buildings at all appropriate times.

(g) All damage to materials or completed work caused by the Contractor or its Subcontractors, Subsubcontractors, or material suppliers prior to Substantial Completion shall be replaced by the Contractor at no cost to the Owner.

(h) The Contractor shall keep all access roads and walks clear of construction equipment, materials, debris, and all other items. The Contractor shall be responsible for repairing all property that was damaged during construction, and shall leave it in as good as or better condition after completion as found before the Work started.

(i) The Contractor shall provide protection for all concrete and finished floors, treads, platforms and the like against mechanical damage, plaster droppings, oil, grease, paint or other materials that will stain the surface finish.

(j) Roofs and waterproof surfaces shall neither be subjected to traffic nor used for storage of materials. When these surfaces must be used, the Contractor shall provide large plywood sheets to protect them from damage.

(k) All temporary protection and coverings shall be removed at Final Completion.

(l) All temporary work shall be removed when it is no longer required. Prior to completion of the work, the Contractor shall remove all spots, stains, dirt and dust from all surfaces that were the result of the construction work. Before final completion, arrangements must be made with the Owner and the Architect to inspect the areas completed.

3.13.5 3.13.5 The Contractor shall take all reasonably necessary steps to prevent unauthorized access to the Work areas, including but not limited to, posting appropriate danger signs and other warning against hazards, and erecting and maintaining adequate barriers and lights in all locations where materials are stored or the Work is in progress. The Contractor shall take all actions reasonably necessary to inform occupants and visitors to the site of any potentially hazardous conditions or other matters potentially affecting their safety.

3.14.3 (insert) 3.14.3 Structural elements of the Work shall not be cut, patched, or otherwise altered or repaired without prior authorization issued by the Architect in writing except as required by the Drawings and Specifications or as approved by the structural engineer. Authorized operations involving structural elements of the Work shall be performed under the direct supervision of the Contractor. All Subcontractors involved in such operations shall be required to provide competent supervision of their respective phases of the Work.

3.15.1 Delete period at end, and add the following:

, and shall completely clean the site of the Work, removing and disposing of all construction.related debris and rubbish, and cleaning all Work-related stains, spots, marks, dirt, mortar smears, plaster smears, paint smears, caulking smears, and other foreign materials from exposed surfaces inside and outside the buildings. Without limiting the generality of the above, the following specific work shall be done:

(a) Concrete and masonry shall be cleaned free of all foreign matter. If, in opinion of Architect, further cleaning of specific areas is required they shall be scrubbed with water or other cleaning agents. Acid cleaners will not be permitted, except as otherwise specifically called for.

(b) Glazed finishes shall be washed with clean water, mild soap, and soft rags, thoroughly rinsed, and then wiped with clean, soft white rags.

(c) Painted surfaces shall be cleaned free of all foreign matter and, if necessary, shall be lightly scrubbed at specific stains with clean water, mild soap, and soft rags, thoroughly rinsed, and then wiped with clean, soft white rags.

(d) Resilient flooring shall be given final cleaning and buffing.

(e) Architectural woodwork shall be thoroughly dusted and cleaned of all stains, spots, etc., using methods and cleaning agents previously approved by the Architect which will not damage the various finishes.

(f) Metal surfaces, hardware, fixtures, appliances, equipment and similar items shall be cleaned free of all foreign matter and, if necessary, shall be lightly scrubbed at specific stains with clean water, mild soap, and soft rags, thoroughly rinsed, and then wiped with clean. soft white rags.

(g) Glass, mirrors, plastic and similar surfaces shall be thoroughly cleaned by professional window cleaners upon installation and, thereafter, as required whenever such surfaces are soiled as a result of the operations of Contractor's work. All damaged, broken, or scratched items shall be replaced without cost to the Owner.

3.18.1 In the 9th line after "property", delete "(other than the Work itself)". In the 11th line after omission", insert the words "or unreasonable delay".

3.18.4 (insert) 3.18.4 Contractor hereby indemnifies and holds the Owner harmless from liability for injury to or death of any and all persons, including the Contractor's employees, and for any and all damage to property caused by, resulting from or arising out of any act, omission, or neglect on the part of the Contractor or of any Subcontractor or of anyone directly or indirectly employed by any of them or of anyone for whose acts any of them may be liable in connection with operations under this contract.

Article 4: Administration of Contract

4.1.3 Delete in line 2 after the word "architect" the phrase "against whom the Contractor makes no reasonable objection."

4.2.1 Insert a period after the work "Documents" in the 2nd line and delete the remainder of the sentence. Delete the 3rd sentence entirely.

4.2.2 Delete the 2nd sentence.

4.2.3 "Insert at the end of the last sentence "Nothing in this subparagraph shall relief the Architect from liability under any other provision of the Contract Documents."

4.2.3 Delete the 1st sentence.

4.2.6 Delete the words "have authority to" in the 1st line. Delete in line 9 the words "good faith" and substitute the words "in the exercise of due professional diligence."

4.2.7 Insert a period after the word "Sample" in line 3 and delete the balance of the sentence.

4.2.11 Insert in line 6 after the word "upon" the phrase "but in no event later than 15 days after written request is made for them" and delete the balance of the Paragraph.

4.3.2 Delete the word "including" in the 1st line and substitute "excluding". Delete the period at the end and insert "or (6) the Claim relates to an error or omission of the Architect."

4.3.6 Delete from the word "or" in line 4 through the word "Documents" in line 8, and insert in its place "and were not discoverable upon the inspection by Contractor pursuant to Paragraph 3.1.2." Insert in line 18 after the word Documents "or were discoverable by Contractor, in its review pursuant to paragraph 3.2.1."

Insert at the end the following:

(insert) The Contractor represents and warrants that it has visited and carefully inspected all aspects of the site and that it has made such investigation it deems necessary to ascertain for itself the conditions which are likely to be encountered during th performance of the Work. The Owner does not warrant or guarantee the present state of the buildings or the conditions that will be encountered during performance of the Work. The Contractor will make no claim for additional payments, extra work, allowances or damages, because of minor variances from conditions encountered during construction which should reasonably have been anticipated and which require additional labor or materials or cause damage. A Change Order shall be required pursuant to Article 7 for major unforeseen or concealed conditions which require additional labor or materials or cause damage.

(insert) Before proceeding with excavation for foundations or utility conduits, the Contractor shall obtain all available information from the various City of Boston departments and private utility companies with regard to utilities located within the area of the project and the Contractor shall make all necessary arrangements with such municipal and/or utility officials for relocation, abandonment or temporary shut off of said facilities.

4.3.7 Section on claims for additional cost moved to 4.3.7

Add the following at the end:

If the Contractor claims that any such instructions or orders whether oral or written, by drawings, or otherwise, involve extra cost or time, and such instructions or orders are not accompanied by a written acknowledgment by the Owner or Architect that extra payment will be made or time extended, Contractor shall promptly so notify the Architect and Owner in writing and shall not proceed with the Work until it has received from the Owner and Architect a further written order to proceed, except as provided in paragraph 10.3, in the case of any emergency affecting life or property. No claim for extra cost or time on account of such instructions or orders shall be valid unless the Contractor has so notified the Architect and Owner, before proceeding and has received the further written order to proceed.

4.3.8.2 Delete the words "and could not have been reasonably anticipated" in the fourth line.

4.5.2 Insert at the end:

(insert) Owner and Contractor agree that in case any matter shall arise between the parties hereto which is subject to arbitration proceedings, such matters shall be referred to an arbitrator selected in the following manner: If the Owner and Contractor cannot agree upon the appointment of a single arbitrator with thirty days after the filing of the demand or submission the "Demand Date"), the Owner and the Contractor shall within the ensuing 21 days (the "Appointment Period") each choose one arbitrator and serve written notice thereof upon the other (each party bearing the cost of its own selection). The two arbitrators so chosen shall choose a third arbitrator, who shall be an attorney, and both parties shall share equally the cost of the third arbitrator. Such third arbitrator shall be chosen within sixty days of the Demand Date. The award in writing signed by any two of the arbitrators shall be final. If either party shall refuse or neglect to appoint an arbitrator within the Appointment Period and to serve notice on the other as herein provided, then the arbitrator appointed shall have the power to proceed to arbitrate and make final awards as if such arbitrator were appointed by both parties for that purpose. Such arbitrators' award in writing shall be final. Notwithstanding any provision to the contrary in the Construction Industry Arbitration Rules of the American Arbitration Association, this method of appointing an arbitrator shall be followed and shall be specifically enforceable in any court having jurisdiction thereof.

4.5.5 Delete.

Article 5: Subcontractors

5.1.3 (insert) 5.1.3 Nothing contained in the Contract Documents shall create any contractual relation between the Owner or the Architect and any Subcontractor or Sub-subcontractor or supplier of materials.

5.2.1 Add the following at the end:

The Contractor at or before Substantial Completion shall provide the Owner with a complete, written list of all actual Subcontractors and suppliers of equipment and materials for the Work with the address and telephone number of each and a description of the portion of the Work performed by each.

5.2.2 Add the following at the end:

Owners objections may include concerns such as Minority/Female Business status, minority/female hiring and Owner's past experience with such Subcontractor or suppliers.

5.3.2 (insert) 5.3.2 The Contractor shall require in its written contract with each Subcontractor that, in the event of any default by the Contractor under the Subcontract, or in the event of the termination of this Contract, the Owner shall have the right, but not the obligation, prior to termination of the Subcontract and after notice by the Subcontractor to the Owner of such default or, in the case of termination of this Contract, after notice by Owner to Subcontractor of such termination, to assume the Contractor's rights and obligations under the Subcontract arising after such notice. Owner shall have the right to review each subcontract to ensure compliance with this subparagraph.

5.3.3 (insert) 5.3.3 The Contractor shall require that each Subcontractor agree by its Subcontract to be joined in arbitration proceedings involving the Owner, the Contractor, the Architect, or any of them, relating to any Work covered by its Subcontractor, at the election of either the Owner or the Contractor. The Contractor shall require each Subcontractor to include a similar provision in its Sub-subcontracts.

5.3.4 (insert) 5.3.4 The Contractor shall procure materials from such sources and shall manage its own forces and the forces of its Subcontractors and Sub-subcontractors in such a manner as will result in tranquil relations on the job site. The Contractor shall employ, and shall require its Subcontractors to employ, men and women on the Work who will at all times work in tranquility with others engaged in the Work. Should the Work for any reason be stopped or materially delayed, in the reasonable judgment of the Owner, due to a labor dispute involving the employees of, or directed at, any Subcontractor or any of its Sub-subcontractors. the Owner shall have the right to require the Contractor, to the extent Contractor is legally able to do so, to substitute a Subcontractor acceptable to the Owner. Contractor shall require each Subcontractor to agree by its Subcontract to be bound by the provisions of this Subparagraph 5.3.4. Nothing in this Subparagraph 5.3.4 shall create any third party beneficiary relationship between the Owner and the Subcontractor.

Article 6: Work by Owner or by Separate Contractors

6.2.4 Delete the word "wrongfully" in the first line.

Article 7. Changes in the Work

7.3.3 In the 3rd line, insert ", as selected by Owner" after the word "methods".

7.3.3.3 Add the following at the end:

As used in this subparagraph, "Cost" shall include all items of cost and expense incurred by the Contractor resulting from the proposed change in the Work for performing that work covered by the change, including costs and expenses of labor, materials for construction, equipment and fixtures, field engineering, additional bond premium, workmen's compensation insurance, social security, public liability insurance, job overhead expenses, and all other expenses directly connected with construction. but excluding general overhead expenses, kickbacks, rebates or discounts received in connection with the construction of the Project; and excluding any return on or cost of the Contractor's working capital, such return on or cost of working capital being part of or to be paid from the Contractor's fees or profit.

7.3.6 Add the following at the end:

The allowed fee schedule for Changes in the work is as follows:

a. For deductions to the Contract Sum there shall be no credit for profit on the deleted work.

b. For additions to the Contract Sum for work performed by the Contractor with his own forces, there shall be added to the cost of the additional work a percentage fee for overhead and profit of 6%.

(c) For additions to the Contract Sum for work performed by a subcontractor there shall be added to the amount charged by the subcontractor the sum of 4% of that amount for the Contractor's overhead.

Article 8: Time

8.1.1 Add the following at the end:

The parties agree that the Contract Time as hereinabove defined shall be the date of completion and time for performance for the purpose of Chapter 254 of the Massachusetts General Laws, unless an earlier date for completion has been specified in the contract of the person asserting any rights under Chapter 254. The Date of Final Completion of the Work or designated portion thereof is the date certified by the Architect under Subparagraph 9.10.1 when the Work is acceptable under the Contract Documents and the Contract has been fully performed.

8.1.3 Delete the period at the end, and add the following:

, and any remaining Work is minor and can be completed within 30 days and will not interfere with the Owner's use and occupancy of the building. The Contractor shall secure and deliver to the Architect a certificate of occupancy, if applicable, and other approvals and documents required herein as a condition precedent to Substantial Completion.

8.3.1 Delete entirely and substitute the following:

8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by any act, omission or neglect of the Owner or the Architect, or by an employee of either, or by a separate Contractor employed by the Owner, or by changes ordered in the Work, unavoidable casualties, or by labor disputes not directed specifically at Contractor or its Subcontractors, or by delay authorized by the Owner pending arbitration, then the Contract Time shall be extended by Change Order for such reasonable time not exceeding the length of such delay as the Architect may determine. No extension of time shall be granted because of weather conditions except in the event of hurricane, earthquake, or other similar, unanticipated catastrophic condition. Such conditions shall be wholly at the risk of the Contractor whether occurring within the time originally scheduled for completion or within the period of any extension granted. Any additional cost of operations or conditions shall be the responsibility of the Contractor. The Contractor shall use its best efforts to avoid all labor conflicts, specially these between union and nonunion employees. All direct and consequential losses due to labor disputes except those of a national, state, or city wide nature and not directed at Contractor or its Subcontractors shall be borne by the Contractor.

8.3.4 (insert) 8.3.4 The Contractor hereby agrees that it shall have no claim for damages of any kind on account of any delay in the commencement of the Work and/or any delay or suspension of any portion of the Work, whether such delay is caused by the Owner, the Architect, or otherwise. The Contractor acknowledges that his sole remedy for any such delay and/or suspension will be an extension of time as provided in this Article.

Article 9: Payments and Completion

9.2.1 Delete entirely and insert the following:

9.2.1 Attached to the Agreement as Exhibit __ is a Schedule of Values. At the time of each Application for Payment, the Contractor shall, if requested by the Architect or the Owner, indicate (a) by percentage and dollar amount, the extent to which each such portion of the Work has been completed. and (b) the dollar amount of each payment which is allocated to (i) labor and materials incorporated into the Work and (ii) materials not incorporated into the Work. The Schedule of Values shall be used as a basis for the Contractor's Application for Payment but for no other purpose.

9.3.1 Delete that portion of the first sentence through the word "payment" and insert the following:

At the time and in the manner set forth in the Agreement,

Add at the end:

Each Application for Payment shall be on forms of AIA Documents Nos. G702 and G703 or such other forms as Owner's lender(s) may require and shall be accompanied by (a) a certificate from the Contractor stating the amount of all unpaid bills owed by it to Subcontract, to suppliers of materials, and to laborers for work and materials, or either. furnished for the purpose of performance of the Work, and (b) a certificate addressed to the Owner's lender(s) in such form as such lender(s) may require. Contractor agrees further to deliver within ten days of request by Owner, from each such subcontractor supplier or laborer a writing which acknowledges receipt of all prior payments due and acknowledges that such payments are payment in full (less any stated retainage) of all Work previously performed or supplied by each such person which writing shall, if requested, be in form sufficient for recording with the Suffolk County Registry of Deeds.

9.3.4 (insert) 9.3.4 In the event a lien is filed or claimed against the work by any Subcontractor, Sub-subcontractor, laborer or supplier of materials, the Contractor agrees, unless covered by the lien bond required pursuant to Subparagraph 11.4.1 hereof, immediately to bond such lien in accordance with the provisions of M.G.L. c. 254 or to cause such lien to be discharged. If the Contractor shall fail to do so, the Owner may, at its option and at the expense of the Contractor, bond such lien or cause it to be discharged.

9.3.5 (insert) 9.3.5 Unless the Contractor asserts in writing in an Application for Payment that an unpaid claim of a Subcontractor, laborer, or materialman is in dispute as to the amount owed, the Owner shall have the right to pay any such unpaid claim by check payable to the Contractor and the claiming party, and any such payment shall be a discharge of an equal amount of the Owner's obligation to pay Contractor hereunder.

9.3.6 (insert) 9.3.6 The Contractor warrants and guarantees (and agrees to provide certificates to this effect with each Application for Payment) that title to all Work, materials, and equipment covered by an Application for Payment will have passed to the Owner when incorporated in the Project. The Contractor further agrees that the submission of any Application for Payment and the Contractor's receipt of payment thereof shall conclusively be deemed to waive all liens with respect to said Work, materials and labor to which the Contractor then may be entitled.

9.4.1 Delete in its entirety and substitute the following:

9.4.1 The Architect shall, within 10 days after the receipt of the Contractor's Application for Payment, either (a) issue a Certificate for Payment to the Owner, with a copy to the Contractor, for the amount requested by the Application; or (b) issue a Certificate of Payment to the Owner, with a copy to the Contractor for the amount the Architect determines is properly due, notifying the Contractor in writing of its reasons for certifying less than the amount requested as provided in subparagraph 9.5.1; or (c) withhold its Certificate entirely and notify the Contractor in writing its reasons for withholding a Certificate as provide in subparagraph 9.5.1.

9.5.1 In the 1st, 12th and 13th lines, replace the word "may" with the word "shall". In subsection .7, delete the word "persistent," and insert at the end:

including without limitation the schedule of the Work. In subsection .4, insert after the word "evidence" the words "in Owner's or its Lender's opinion."

9.8.1 Delete the period and insert at the end the following:

,and MHFA has issued a Certificate of Completion.

9.8.2 In the 18th and 19th line, change "Substantial" to "Final".

In addition, add the following at the end:

Compliance with the requirements of subparagraph 13.5.3 shall be a condition precedent to Substantial Completion.

9.8.3 In the fourth line' after "retainage, if any", insert:

(subject, however, to a list of minor uncompleted or uncorrected items which do not interfere with Owner's use and enjoyment of the Project (the "Punch List"), and with respect to which Owner shall withhold 150% of the reasonable cost of fully completing same as determined by the Architect), 9.9.1 Add the following sentence at the end:

If the Architect finds the Work unacceptable, it will prepare a Punch List. Such Punch List shall be subject to the approval of MHFA. When such items are completed or corrected to the satisfaction of the Architect and MHFA, it shall promptly issue a final Certificate for Payment as provided above.

9.10.2 Change the period at the end of the first sentence to a comma, and insert the following:

(6) one full and complete set of the as-built Drawings, approved in writing by the Architect. showing all modifications or alterations to the Project made during the course of construction, and (7) one bound set (with a table of contents thereto) of all operating or maintenance instructions or descriptions of all mechanical, electrical and manually operated equipment, light fixtures, windows, doors, roofing, carpet and flooring materials. The Contractor shall provide a listing by area of all paints used with the color and manufacturer and the names, and shall also provide a list of the addresses of the distributors from which these components or materials were purchased.

Article 10: Protection of Persons and Property

10.2.4.1 (insert) 10.2.4.1 The Contractor will be solely responsible for compliance with laws and regulations governing the handling, storage, us or disposal of hazardous materials or wastes used, stored, generated, or disposed of in connection with construction of the Work, and shall obtain all permits and approvals, give all required notices, and observe all applicable procedures prescribed by the U.S. Environmental Protection Agency, the Massachusetts Department of Environmental Quality Engineering, and other governmental authorities having jurisdiction with respect to such activities. At Owner's request, Contractor shall furnish Owner promptly with evidence satisfactory to Owner demonstrating Contractor's compliance with such procedures, the giving of such notices, and the issuance of such permits and approvals, and shall indemnify Owner and hold Owner harmless with respect to any loss, damage or liability resulting from Contractor's failure to observe such procedures, give such notices, or obtain such permits and approvals. Contractor will be responsible for removal and disposal only of such "oil" and "hazardous material", as defined by Massachusetts General Laws, c. 21E, as is required to be removed by the Contract Documents or any such materials placed on the site by the Contractor or any Sub-Contractor.

10.2.8 (insert) 10.2 8 The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services and shall comply with all recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site.

10.2.9 (insert) 10.2.9 The Contractor shall, at all times, reasonably protect excavations, trenches, buildings and materials, from rain water, ground water, back-up or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. Contractor shall provide and operate all pumps, piping and other equipment necessary to this end

10.2.10 (insert) 10.2.10 The Contractor shall remove snow and ice which might result in damage or delay.

10.2.11 (insert) 10.2.11 During the progress of the Work, the Contractor shall take every reasonable step to prevent damage to completed Work or work in progress, or to materials stored on the premises. The Contractor shall take all reasonable precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner forming part of the Work located at the Project site. The Contractor shall have full responsibility for the security of such property.

10.2.12 (insert) 10.2.12
All work performed under the Contract shall conform to the requirements of Chapter 111, Sections 31C and Section 142D of the General Laws, Commonwealth of Massachusetts Department of Public Health, Division of Environmental Health.

10.2.13 (insert) 10.2.13 The Contractor shall comply with the "Rules and Regulations for the Prevention of Accidents in Construction Operations. Industrial Bulletin No. 12. effective April 19, 1967", as it may have been updated, by the Division of Industrial Safety, Department of Labor and Industries, Commonwealth of Massachusetts and the Occupational Safety and Health Act, "OSHA" and all regulations pursuant thereto. Any fines levied against the Owner due to the Contractor's (or his Subcontractor's) failure to comply with OSHA standards or other Federal, State and local regulations shall be paid by the Contractor.

Article 11: Insurance

11.1.1 In the first line, following the word "maintain", insert the words "in an admitted carrier rated A or better and to which the Owner has no reasonable objection, and with Owner named as additionally insured,"

11.1.2 Delete entirely and substitute the following:

11.1.2 The insurance required by Subparagraph 11.1.1 with respect to the Contractor shall be written for not less than the following:

.1 Worker's Compensation

a)	State	Statutory
b)	Employer's Liability	Statutory

.2 Comprehensive General Liability (Including Premises-Operations; Independent Owner's and Contractor's Protective; Products and Completed Operations Broad Form Property Damage)

a) Bodily Injury

1)	Each Occurrence	$1,000,000
2)	Annual Aggregate	$1,000,000

b) Property Damage

1)	Each Occurrence	$1,000,000
2)	Annual Aggregate	$1,000,000

.3 Personal Injury

Annual Aggregate	$1,000,000

.4 Completed Operations and Products Liability as well as Contractor's Liability coverage insuring the indemnity agreement in this Contract shall be maintained for two (2) year after Final Payment.

.5 Property Damage Liability Insurance shall include coverage for the following hazards:

X (excavation) C (collapse) U (underground)

In addition the policy shall be endorsed to insure against liability for damage resulting from blasting or pile driving operations, undermining and for damage to underground pipes and utilities caused by digging with mechanical equipment.

.6 Comprehensive Automobile Liability

a) Bodily Injury

1)	Each Person	$1,000,000
2)	Each Occurrence	$1,000,000

b) Property Damage

1)	Each Occurrence	$ 250,000

.7 Renewal certificates shall be addressed to and filed with both the Contractor and the Owner at least thirty (30) days prior to the expiration date of required policies.

.8 Unless, in particular cases, the Owner and Contractor shall agree otherwise in writing, the Contractor shall require all Subcontractors to maintain insurance conforming to the provisions of this Paragraph 11.1 and the Contractor shall maintain on file all such required Certificates of Insurance, which file shall be available for inspection by the Owner upon request.

.9 In addition to the Comprehensive General Liability coverage required to be carried by the Contractor pursuant to this Article 11. the Contractor shall also provide the Owner with Certificate(s) of Insurance under a Blanket Excess Liability policy. Said policy shall contain limits of coverage for personal Injury and Property Damage in amounts not less than $5,000,000 per each occurrence, $5,000,000 aggregate and the Owner shall be added as a named insured thereon.

11.1.3 In line 6, delete "30" and substitute "60".

11.3.1 Delete and substitute the following:

11.3.1 The Owner shall purchase and maintain so-called builder's risk insurance upon the entire Work at the site in the amount it deems reasonably necessary. This insurance shall cover the Work as installed and materials intended for installation which have been delivered to, unloaded, and stored securely (and in accordance with the Owner's written instructions) on the site. The Contractor shall purchase and maintain insurance upon materials not yet installed and not stored securely on the site.

The insurance referred to in this subparagraph 11.3.1 shall be subject to the following limitations:

.1 Excepted from coverage shall be owned, rented or leased construction tools and equipment to be used to perform Work by the Contractor and its Subcontractors.

.2 The Contractor and its Subcontractors shall be solely responsible for all loss or damage to construction tools or equipment used to perform the Work. Any insurance protecting such equipment shall include an endorsement waiving the insurer's right of subrogation against the Owner, Architect, and their consultants.

.3 If by the terms of this insurance a deductible is required, in the event of a paid claim the Contractor shall be responsible for the deductible amount up to a sum not to exceed $3,000 per claim.

Any loss insured under subparagraph 11.3.1 is to be adjusted with the Owner and shall be made payable to the Owner or Owner's lender(s) (or any other person or institution chosen by the Owner) as trustee and agent for the insureds, as their interests may appear, subject to the requirements of any applicable lender clause and of subparagraph 11.3.10.

11.3.9 Delete entirely and substitute the following:

11.3.9 Upon the occurrence of an insured loss, the Owner shall deposit in a separate interest-bearing account (if possible) any money so received and the Owner shall distribute it in accordance with such agreement as the parties in interest may reach or in accordance with an award of arbitration in which case the procedure shall be as provided in paragraph 4.5.

11.3.10 Insert a period after "insurers" in the second line and delete the balance of this subparagraph.

11.3.12 (insert) 11.3.12 Nothing in this Agreement shall be construed as calling for the name of the Contractor or any Subcontractor or any Sub-subcontractor as loss payee on Owner's insurance, and no draft or other instrument in payment of any loss shall name the Contractor, subcontractor and subcontractor as joint payees thereof. In the event the insurance proceeds paid to the Owner are not made available for reconstruction, the Owner shall promptly notify the Contractor of such fact and such notification shall be treated as a termination in accordance with the provisions of Article 14.

11.3.13 (insert) 11.3.13 The Contractor shall require each of its Subcontractors to procure and maintain during the life of its subcontract all the insurance reasonably required by the Owner or Owner's lender and shall not allow its Subcontractors to begin work until the insurance has been so obtained and certificates of insurance approved. The Contractor shall require each Subcontractor to provide a 30 day written notice to the Contractor of cancellation or material change to any of the insurance coverages.

11.4 Delete entirely and substitute the following:

11.4 The Contractor shall furnish, in form and substance satisfactory to the Owner and to Owner's lenders bonds (1) covering the faithful performance of the Contract, (2) the payment of all obligations arising hereunder, and (3) preventing the creation of any mechanics or materialmens'liens under M.G.L. c.254. Each such bond shall be in dual or triple obligee form, as requested by Owner, and shall be for the Contract Sum from the commencement of the Work until one year after Final Completion. The performance bond shall survive acceptance of the Work by the Owner to the extent of guaranteeing Contractor's performance under paragraph 3.5 and paragraph 13.2.

11.4.1 (insert) If, at any time after execution and approval of a bond required by the Contract Documents, the Owner shall deem any sureties upon such bond to be unsatisfactory, or if, for any reasons, such bond shall cease to be adequate security for the Owner, the Contractor shall, within five (5) days after notice to do so, furnish a new or additional bond, in form, sum and signed by such sureties as shall be satisfactory to the Owner. No further payment shall be deemed due nor shall any further payment be made to the Contractor unless and until such new or additional bond shall b furnished and approved. The premium on all bonds shall be paid by the Contractor.

Article 12: Uncovering and Correction of Work

12.2.1 Delete and substitute the following:

12.2.1 The Contractor shall within thirty days correct all Work rejected by the Architect as defective or failing to conform to the Contract Documents whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Architect's additional services made necessary thereby and any cost, loss, or damages to the Owner resulting from such defect or failure. This obligation shall survive termination of the Contract under Article 14.

12.2.2. Insert the word "Final" in place of "Substantial" on the first line. Insert the following immediately after the first sentence:

Final Payment or an Architect's Certificate for Final Payment shall not be deemed acceptance of unsatisfactory conditions.

Delete the second sentence.

12.3.1 Delete the period at the end of the final sentence, and add the following:

, and if the payments due to the Contractor are insufficient to cover the adjustment, the Contractor shall pay the difference to the Owner.

Article 13: Miscellaneous Provisions

13.1.2 (insert) 13.1.2 Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or its not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

13.2.2 (insert) 13.2.2 Owner shall have the right to assign this Contract to lenders as further security for such loans, and the Contractor shall sign all documents reasonably required by such lenders to evidence acknowledgment of assignment.

13.2.3 (insert) 13.2.3 If, after making Final Payment, the Owner conveys to a third party any building or other improvement renovated under the Contract, any rights which the Owner may have against the Contractor for maintenance service and for claims which, under the terms of subparagraph 9.9.4. are reserved to the Owner after the making and acceptance of final payment, shall automatically transfer to such third party.

13.5.7 (insert) 13.5.7 Certificates of occupancy (as applicable) and certificates of inspection testing and approval, including operating permits for any mechanical apparatus, such as boilers and air compressors which may b required to permit full use and occupancy of the premises by the Owner and tenants or which may be required by the Contract Documents shall be secured and paid for by the Contractor and promptly delivered to the Architect. This shall be a condition precedent to Substantial Completion of the Work. Architect's or any engineer's services required to obtain such certificates, permits, or approvals shall be paid for by th Contractor.

13.6.1 Delete paragraph in its entirety and insert the following:

Payments due and unpaid under the Contract Documents shall bear interest at the prime rate from time to time published by The Wall Street Journal.

Article 14: Termination of the Contract

14.1.1 Replace the word "30" with the word "90" in the 2nd line.

14.2.1 Delete and substitute the following:

14.2.1 If a petition is filed by the Contractor, or against the Contractor with his consent, under any federal or state law concerning bankruptcy, reorganization, insolvency or relief from creditors. or if such petition is filed against the Contractor without his consent and is not dismissed within thirty (30) days, or if the Contractor is generally not paying his debts as they become due, or if the Contractor becomes insolvent, or if the Contractor's consents to the appointment of a receiver, trustee, liquidator, custodian or the like of the Contractor or of all or any substantial portion of its assets, or if a receiver, trustee, liquidator custodian or the like is appointed with respect to the Contractor or takes possession of all or any substantial portion of its assets or if the Contractor makes an assignment for the benefit of creditors, or if the Contractor refuses or fails to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to any Subcontractor for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractor or disregards laws, ordinances rules. regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a violation of any provision of the Contract Documents, the Owner may, without prejudice to any other right or remedy, and after giving the Contractor and his surety, if any, seven (7) days written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by Contractor, accept assignment of subcontractors pursuant to Paragraph 5.4, and may finish the Work by whatever method Owner may deem expedient.

14.2.4 Insert the following after "thereby" in the 3rd line the following:

plus Owner's direct and consequential damages as a result of Contractor's default

Insert the following at the end.

The Owner may terminate the Contract, at its option, in the case of a casualty, condemnation or other event not within the Owner's reasonable control without written notice. In the event of such termination, the Contractor shall be entitled to payment in accordance with the provisions of Paragraph 14 of these General Conditions.

Article 15 Equal Opportunity/Affirmative Action

15.1 (Insert) 15.1 The work to be performed by the Contractor under this Agreement is for a project in which financial assistance is being provided, in part, by public authorities. The Contractor therefore agrees to comply with all MHFA and City of Boston requirements including, but not limited, those concerning Equal Employment Opportunity, Minority and Women's Business Utilization. The Contractor also agrees to comply with the City of Boston requirements concerning Equal Employment Opportunity as specified in the 1987 Boston Jobs Ordinance.

15.2 (insert) 15.2 The Contractor agrees to comply with all the requirements of the City of Boston with respect to Resident Jobs Policy and Minority Women Business Participation, as laid out in the City of Boston Compliance Contract Supplement, and, if applicable, with the Massachusetts Housing Finance Agency's Equal Opportunity/Affirmative Action Contract. Both of these documents are attached herewith and made part of this Agreement.

15.2.1 (insert) 15.2.1 The City of Boston standards are that projects in certain areas including that wherein the Project is located, meet the following ratios for Employment and subcontracts:

1. at least ___% of the workforce shall be Boston residents; in addition, every effort shall b made to recruit from among residents of the _______________________ neighborhood;

2. at least __% of the workforce shall be Minorities;

3. at least __% of the workforce shall be Females;

4. at least __% of the dollar value of the Agreement shall be awarded to Minority Business Enterprises., and

5. at least __% of the dollar value of the Agreement shall be awarded to Women's Business Enterprises.

15.2.2 15.2.2 The Contractor shall comply fully with the applicable City of Boston, MHFA, and other governmental requirements related to Equal Opportunity and Affirmative Action in hiring and subcontractor selection and with all applicable reporting requirements.

15.2.3 15.2.3 In order to enable the Owner to monitor directly the Contractor's compliance, the Owner and Contractor shall take the following steps in addition to those required by various public agencies.

1. With respect to Minority and Women's Business Enterprises:

   a. As soon as practicable after being selected as Contractor and prior to awarding any subcontracts, Contractor shall meet with Owner to discuss the subcontractor goals listed above, the Contractor's plans for attaining these goals, and the Owner's plan for monitoring their attainment.

   b. Prior to awarding any subcontract the Contractor shall provide the Owner with the name and MBEWBE status of each subcontractor asked to bid on the Work. This information shall be received by the Owner regarding all subcontractors bidding on a given subcontract at least two weeks prior to Contractor's award of that subcontract.

   c. Subsequent to the notification described above and prior to awarding each subcontract, the Contractor shall provide the Owner with the name and MBEWBE status of each subcontractor with whom Contractor intends to contract, with a statement of the dollar value of the proposed contract, and with an explanation of the Contractor's reasons for declining any bid from a MBEBE subcontractor for this work. Owner shall receive this information at least one week prior to Contractor's award of each subcontract.

d. The Contractor shall notify the Owner promptly after the award of any subcontract, indicating the name and MBEWBE status of the subcontractor and the dollar value of the contract. Owner shall receive this information within five working days after the award of the subcontract.

e. The Contractor and Owner shall meet, at the Owner's request, at intervals throughout the subcontractor selection process, in order to assess the Contractor's progress in meeting the Minority/Female Business Enterprise goals stipulated herein and to determine whether any additional action is necessary to help achieve these goals.

2. With respect to Workforce requirements:

a. The Contractor and all Subcontractors shall met with the Owner as soon as is practicable after the closing f the construction loan in order to discuss the Boston Residency Minority/Female hiring goals agreed to herein and to discuss the Contractors' and Subcontractors' proposed methods of achieving these goals.

b. The Contractor shall provide the Owner with copies of all Equal Opportunity reports submitted by the Contractor to public agencies, in particular with the Minority Utilization Reports filed with the City of Boston and with the Contractor's Monthly Staffing Report filed with MHFA. These reports shall be submitted to the Owner at the same time they are submitted to the respective public agencies.

c The Contractor and Subcontractors shall meet with the Owner at the Owner's request if at any time during the term of this Agreement the ratios of Resident/Minority/Female workers appear to be lower than the target ratios listed herein, in order to discuss actions which can be taken to achieve the target ratios.

END OF
SUPPLEMENTAL GENERAL CONDITIONS

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A311

Performance Bond

KNOW ALL MEN BY THESE PRESENTS: that

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Contractor, and,

(Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Owner, in the amount of

Dollars ($),

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated 19 , entered into a contract with Owner for

(Here insert full name, address and description of project)

in accordance with Drawings and Specifications prepared by

(Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

1) Complete the Contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and sealed this day of 19

(Principal) (Seal)

(Witness)

(Title)

(Surety) (Seal)

(Witness)

(Title)

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A311

Labor and Material Payment Bond

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS: that

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Principal, and,

(Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the

amount of

(Here insert a sum equal to at least one-half of the contract price) Dollars ($),

for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated 19 , entered into a contract with Owner for

(Here insert full name, address and description of project)

in accordance with Drawings and Specifications prepared by

(Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

LABOR AND MATERIAL PAYMENT BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this day of 19

(Principal) (Seal)

(Witness)

(Title)

(Surety) (Seal)

(Witness)

(Title)

Exhibit A

SPECIAL CONDITIONS

Contractor agrees to comply with the following conditions required by Massachusetts Housing Finance Agency (MHFA) and the Owner:

1. If any provision of the General Conditions of this agreement is inconsistent with the Construction Loan Agreement between the Owner and the Massachusetts Housing Finance Agency, the terms of the Construction Loan Agreement shall govern. The Contractor agrees to assist the Owner to fulfill all of the Owner's obligations under said Construction Loan Agreement including, without limitation, compliance with cost certification requirements of the MHFA which shall be required for payment to the Contractor, provided nothing herein contained shall require the Contractor to perform any construction work or furnish any materials or equipment other than required in the Plans and Specifications, nor to perform its work in a time other than as hereinabove set forth.

2. Contractor will maintain and shall obtain from each subcontractor during the period of construction such Worker's Compensation as is required by statute, and comprehensive general liability insurance, in amounts of not less than $500,000 in respect to bodily injury or death to any one person, not less than $1,000,000 in respect to bodily injury or death to any persons in any one accident or occurrence and not less than $500,000 for property damage. Contractor shall furnish fire and extended coverage insurance (in Builder's Risk Completed Form) in amounts equal to the mortgage loan.

3. No extension of time shall be granted by reason of delays experienced in obtaining materials, supplies, equipment, or the like unless the Contractor shall, at the time such extension is requested, provide evidence satisfactory to the Architect that the materials, supplies, equipment or the like were ordered, purchased or otherwise contracted for in a timely fashion and that the failure of the person claiming delivery of the same on or before the time or times required for the expeditious performance of the work hereunder results from causes beyond the Contractor's reasonable control.

4. Prior to any advance hereunder, and as a condition precedent to each advance, Contractor, if requested by MHFA, shall furnish surveys made by a licensed surveyor satisfactory to MHFA and the title insurance company or companies insuring the interest of MHFA as mortgagee. Said surveys shall be certified to MHFA, and said title insurance company or companies shall show such items as MHFA may from time to time reasonably require.

5. Contractor shall permit MHFA to enter upon said premises and to have access to the Project and the construction thereof and all materials, fixtures and articles used or to be used in the construction and to examine all detailed plans, shop drawings and specifications which are or may be kept at the Project site and shall furnish to MHFA, when requested, copies of such plans, drawings and specifications.

6. Contractor agrees that the materials, fixtures or articles used in the construction of the Project or appurtenances thereto or to be used in the operation thereof shall comply with the quality required by the Plans and Specifications and any changes therein approved by a representative of MHFA and Owner.

7. Contractor shall not execute any conditional bill of sale or chattel mortgage covering any materials, fixtures or articles used in the construction of the Project or appurtenances thereto which are intended to become and shall become part of said Project or used articles of personal property which are intended to become part of the Project; if title to any such materials, fixtures or articles shall not vest unconditionally in Owner, free from encumbrances, on delivery at the premises, Contractor shall produce for Owner, upon demand, the contracts, bills of sale, statements, receipted vouchers or agreements or any of them, under which the Contractor claims title to such materials, fixtures and articles. The Owner shall not be obligated to make payments to the Contractor hereunder if there are then liens or encumbrances on any materials, supplies, fixtures or articles, furnished by Contractor or any person claiming through or under Contractor, which liens or encumbrances involve claims against Contractor or the person claiming through or under Contractor and the cost or expense of which is to be included in such advance.

8. The contractor shall provide construction performance and payment bond with a surety company satisfactory to MHFA in an amount equal to one hundred (100%) percent of the cost of construction as computed by MHFA, which shall comply

with, but not be limited to, compliance with the provisions of Massachusetts General Laws, Chapter 149, section 29, as required by Section 5 of Chapter 708 of the Acts of 1966. The Contractor shall furnish a mechanics lien bond pursuant to Massachusetts General Laws, Chapter 254, Section 12.

9. Contractor shall provide Owner and MHFA at least three (3) working days prior written notice of the time when each of the following events are to occur with respect to each separate building, to permit a representative of MHFA and Owner to make an inspection:

   (a) Commencement of the pouring of concrete for the foundation;

   (b) Commencement of covering of the framing, plumbing and electrical work;

   (c) Preparation of the final "punch list" with representatives in attendance of the Contractor, the Architect, Owner and MHFA;

   (d) Final inspection with representatives in attendance of the Contractor, Architect, Owner and MHFA.

10. Pursuant to Section 5(a) of Chapter 708 of the Acts of 1966 as amended, the laborers, teamsters, chauffeurs and mechanics employed or to be employed in the work shall be paid the prevailing wages in the locality where the Project is located as determined by the Commissioner of Labor & Industries under the authority of Sections 26, 27, 27B, 27C, and 27D of Massachusetts General Laws, Chapter 149, except that when the project is being assisted under the Section 8 Housing Assistance Payments program, laborers and mechanics employed or to be employed are to be paid no less than the prevailing wages in the locality where the project is located, as determined by the Secretary of Labor pursuant to the Davis-Bacon Act (49 Stat. 1011), if said wages are greater than the prevailing wages as determined by the Commissioner of Labor and Industries. Contractor shall provide such certificate as MHFA shall request, certifying that such wages have been paid, post the prevailing wages in a conspicuous place on the site, and provide to the MHFA upon request a list of all such workers by name, job description, dates of employment and wage rates paid.

11. If requested by MHFA, Contractor shall disclose to Owner and MHFA the names of all persons with whom Contractor has contracted for the construction of the Project or the furnishing of labor or materials thereof.

12. Prior to any advances, Contractor will execute an affidavit that: (i) All monies previously advanced, pursuant to the requisitions of the mortgage loan, have been paid to, or are being held, for the General Contractor, subcontractors, or suppliers; (ii) There are no further amounts owing to the knowledge of the Contractor other than as set forth in the current requisition; and (iii) Only materials, fixtures and equipment to which Borrower has absolute title have been used and shall provide such stipulations, acknowledgments of payment, postponements, subordinations, releases, discharges, and waivers of notice, claims, liens and rights of lien, and such other assurances from the General Contractor, subcontractors, and suppliers as MHFA may from time to time require.

13. The Contractor shall, on or before the commencement of the work hereunder, provide the Owner with a detailed progress schedule for the progress of the work, which schedule shall be satisfactory to MHFA and shall, further, notify the Architect and the Owner of any substantial deviations from the said progress schedule when said deviations are discovered and, if the deviation involves the extension of time required to accomplish any item of the work, provide the Architect and the Owner with a statement by the Contractor giving the reasons for such deviation and the steps being taken by the Contractor to remedy such deviation.

14. No changes in the Drawings and Specifications or any terms of the Contract Documents or orders for extra work or changes by altering, adding to or deleting from the work, which result in any net construction cost increase, cost decrease, or will change the design concept, can be effected, except with the prior written approval of MHFA, and under such conditions as the MHFA may establish.

15. Copies of all proposed change orders, together with relevant detailed cost breakdowns, working sketches, drawings or shop drawings must be submitted to MHFA through the Architect and Owner for review, evaluation and acceptance prior to a commencement of work, on AIA Document No. A701.

16. Contractor shall cooperate with Owner in satisfying MHFA cost certification procedures and requirements, including, but not limited to, the completion of forms and certificates, prior to and following any termination of this Agreement for such construction work performed by Contractor, and otherwise cooperate with and assist Owner in satisfying the provisions of the Construction Loan

Agreement. Contractor also agrees with request by Owner promptly to prepare and promptly furnish, or cause to be prepared and furnished, all requisitions, certifications and statements required for submission by MHFA, and, in addition, all other certificates and certifications, including, but not limited to, cost certification statements required by MHFA to be prepared or furnished by the Contractor or any Subcontractor for the completion of MHFA cost certification requirements and procedures.

All information and certifications for MHFA Cost certification shall be provided by the Contractor within thirty (30) days of Substantial Completion.

17. In the event there is identity of interest between the Contractor and any such Subcontractor, equipment lessor or supplier, the Contractor shall include in all such subcontracts, equipment leases and purchase orders a provision requiring the subcontractor, equipment lessor or supplier to certify its costs incurred in connection with the Project, as required by MHFA in or within the time requirements by MHFA.

MASSACHUSETTS HOUSING FINANCE AGENCY

REVISED 1/22/92

PROJECT NAME: ______________________________
PROJECT NO: ____________________
DATE: ____________________

ADDENDUM #1

The following material and construction recommendations have been developed by the Agency through experience with its portfolio to insure a reasonable level of material and construction standards. These are the minimum recommended in these areas and must be included in both Outline Specifications and Closing Specifications and the work included in the contract amount.

If you choose not to follow these recommendations you must submit an additional guarantee in the form of the attached letter.

The new Federal Fair Housing Amendments Act of FFHAA 1988 will require 100% of all new construction to have Adaptive Design Features. HUD has developed standards for these features effective 1991. These requirements should be incorporated at the earliest stages of design development. Adaptable Design Features will be required in all units in buildings consisting of four or more units for Federal compliance, and three or more units for State compliance. Provisions that highlight these requirements have been asterisked (*). Until the Commonwealth's Architectural Access Board issues new guidelines, the existing 5% requirment for fully handicapped accessible units will prevail. The Americans With Disabilities Act also requires, certain physical standards for places of public accommodation. The Owner, Architect and Project Attorney should clarify the intent of these new laws as the pertain to housing and commerical spaces.

Division 1: **Testing**

Concrete and soil compaction tests shall be performed by a qualified testing lab for all buildings where applicable. Water leakage and/or masonry tests may be required in certain buildings.

Division 2: **Site Work**

Extruded asphalt curb is not recommended.

(*) An accessible route into and through covered dwelling units is required.

Division 3: **Concrete**

Irregularities in exposed concrete plank ceilings to be filled and finished before painting.

Division 4: Masonry

If aluminum flashing is imbedded in masonry it shall be protected against corrosion by protective coating.

Masonry veneer walls shall be designed and constructed in conformance with the Brick Institute of America Technical Note 28B. This note requires among other items: 9 ga. corrosion resistant wire ties spaced a minimum of 24" on center vertically and horizontally securely attached to the stud for all veneer construction above 3 stories, air space be a minimum of 1" and be kept clear of mortar droppings, and flashing be provided at all horizontal surfaces including floor lines.

Gypsum sheathed backup walls shall be covered with 15# felt or have all penetrations and joints in the waterproof paper coating covered with mastic waterproofing.

Division 6A: Rough Carpentry

Wood product sheathing shall be installed in strict accordance with manufacturers exposure, spacing and span ratings and shall be stamped by a recognized agency to show those ratings.

(*) Blocking of all bathrooms should be installed for the later installation of grab bars in conformance with FFHAA.

Division 6B: Finish Carpentry and Millwork

MHFA recommends a durable, cleanable finish on cabinets. Currently recommended are high pressure laminate applied to high-density particle board or wood veneer with a durable finish. Low pressure laminate, vinyl or equivalent is not recommended. The following are material and construction guidelines.

1. Cabinet drawers must be full-length (minimum of 18"). Drawers must be designed with a durable, full-length, side-mounted, double runner suspension system with manual positive stops. Currently recommended is a full-length steel system with nylon wheels. Monorail systems are not recommended (with the exception of the Accuride 42 ball bearing system).

2. Drawer bottoms must have a minimum thickness of: 1/8" tempered hardboard or plywood, or 1/4" hardboard or high-density particle board. Drawer sides must have a minimum thickness of 7/16".

3. Cabinet bottoms must have a minimum thickness of: 1/4"tempered hardboard or plywood, or 3/8" hardboard or high-density particle board. Cabinet sides must have a

minimum thickness of 1/2". Toe kicks must be totally enclosed.

4.Wall cabinets must have a minimum of two (2) wood nailing strips (top and bottom). Minimum dimensions for nailers are 3/4" x 1/2".

5.All cabinet interiors must be treated with a water resistant substance.

(*) 6.Provisions for adaptable kitchens and bathrooms as defined in FFHAA should be incorporated in all designs. Adequate storage shall be provided for bathrooms.

Compliance with the above minimum recommendations does not automatically indicate Agency approval. All cabinets are subject to additional review and approval by the Agency.

Kitchens countertops shall be equipped with a backsplash permanently attached to the countertop.

If a stove top abuts side wall protection must be provided against heat and grease.

Division 7: **Thermal & Moisture Protection**

Compliance with the Massachusetts State Building Code is taken to mean that wherever the integral vapor barrier is not continuous an additional vapor barrier conforming to the code must be installed.

Thermal insulation to must or exceed the Massachusetts State Building Code. Calculations may be requested by the Agency to indicate the most cost effective insulation level. The Agency may further recommend insulation on all pipes in unheated spaces and near uninsulated exterior walls to prevent freezing and damage due to condensation and where it is in the project's interest to do so.

For flat roof applications it is recommended that a roofing system be specified that provides a 10 year guarantee by the manufacturer.

Division 8: **Doors, Windows & Glass**

U value and infiltration rates to meet or exceed recommendations the Massachusetts State Building Code. Calculations may be requested by the Agency to indicate the most thermally cost effective window type. All aluminum windows shall as a minimum conform to AAMA commercial type and be for wind load based upon AAMA formulae.

For insulating glass, the warranty period is 5 years after seal date permanently imprinted on unit, but not less than 5 years after date of substantial completion.

In compliance with the Massachusetts Sanitary Code, a screen door must be provided at all units entered directly from the exterior.

Minimum recommended thickness of steel door frames is as follows:

1. Interior 18 Ga.
2. Exterior and doors set in masonry 16 Ga.

(*) All doors in public spaces and common use portions of building entrances to all dwelling units should have a minimum clear opening of 32" measured from the face of the door in an open position of 90 degrees to the stop.

Division 9: **Finishes**

Stud spacing in public areas is recommended to be 16" o.c.

Provide heavy gauge or double stud at doors larger than 2'8".

It is recommended that full height ceramic tile or equivalent shall be provided at all tubs. Bathroom floors are recommended to be either sheet vinyl or ceramic tile.

Kitchen floors are recommended to be sheet vinyl or V.C.T.

Sheet vinyl where provided is recommended to be .085" thick with a .050" wear layer.

V.C.T. where provided is recommended to be a minimum 1/8" thick in conformance with "high traffic" recommendations of HUD MPS.

Paint finish on kitchen and bathroom walls shall be washable.

Where tubs abut corridor or apartment dividing walls, the fire rating of the wall will be maintained below tub rim in compliance with all codes.

Spray on simulated acoustical ceiling is not recommended in areas subject to high moisture such as kitchens and baths.

(*) Floors under removable base cabinets in kitchens and bathrooms must be installed at initial construction.

Division 10: **Specialties**

It is recommended that a separate pole and shelf shall be provided in all clothing closets (wood or metal). Integral poles, that allow hanger full bearing, and vinyl-clad wire shelf and pole are also accepted.

Division 11: Equipment

Ranges shall have a minimum size of 24" in one and two bedroom units, and a minimum size of 30" in three and four bedroom units.

Refrigerators shall have a separate freezer door and shall be a minimum size of 12 cu. ft. in one and two bedroom units, and a minimum size of 14 cu. ft. in three and four bedroom units.

Division 12: FURNISHINGS

Window shades shall be provided at all unit windows and shall meet the Federal Specification F.S. DDD-S-251.

Traverse rods shall be provided at all sliding glass doors.

Carpeting in all units and public spaces is a standard recommendation unless circumstances exist which make an alternate floor covering more appropriate.

Carpeting when provided is recommended to have the following specifications in conformance with HUD Bulletin, UM 44-D:

Use of Type I, Class 2 for unit interiors.

Use of Type II, Class 2 for elderly or handicapped units and public spaces.

Attached are provisions of UM44-D Density for Type I and Type II.

A separate pad in conformance with applicable flame spread and material standards provided in all but handicapped units and public spaces.

Conformance to face weight recommendations of HUD Bulletin UM 44-D is considered minimum acceptable quality.

Division 15A: Plumbing

Water savers and low flow shower heads shall be provided at all units.

Stainless steel sinks and garbage disposals shall be provided in all kitchens.

All sanitary lines below floor slabs shall be cast iron bell and spigot or equal. PVC is not recommended.

All thermal insulation shall meet or exceed recommendations of the Mass. Building Code. Calculations may be requested by the Agency showing compliance.

The domestic hot water system shall be designed to meet or exceed the recommendations of the Mass. Building Code. Calculations may be requested by the Agency showing compliance.

Shower diverter in Handicapped units should be accessible to handicapped seat.

Bathroom sinks and bathtubs shall be equal in durability to enameled steel or cast iron. In particular they shall not be able to be marred or stained by cigarette burns.

Where plastic waste piping is used, expansion joints shall be provided as recommended by the Mass Building Code and protection of expansion joints must be provided to prevent abrasive material from entering joint.

Spaces with appliances and equipment that may leak substantial amounts of water such as water heaters and clothes washers shall be provided with a floor drain or floor pan and drain.

Air cushions shall be provided at least every set of fixtures to prevent water hammer. Mechanical shock absorbers shall be provided on all fast acting valves.

Division 15A: **PLUMBING**

(*) Adjustable fixtures are required in compliance with ANSI A117.1-86

Division 15B: **HVAC**

Thermal insulation shall meet or exceed recommendations of the Mass. Building Code. Calculations may be requested by the Agency to show compliance.

System design shall meet or exceed the recommendations of of the Mass. Building Code. In particular compliance with 3110.5 shall mean a time clock or other device easily controlled by building management to shut of mechanical ventilation when not required. Calculations may be requested by the Agency to show compliance.

Individual apartment thermostats are to be placed accessible in locations, at least 4' above the floor, but no higher than 4'-6".

Provision for air conditioning shall be made in all units. Air conditioning sleeves, if provided, shall be provided with insulating covers.

Central Boiler controls shall allow building management to easily control the following functions:

1. To shut off distribution when outside temperature reaches a preset temperature.
2. To modulate delivered water temperature in response to outside temperature.
3. To modulate delivered water temperature in response to time of day

It is recommended that the heating system be designed so the main heating plant is not used to heat domestic hot water during the summer months

Division 16: **ELECTRICAL**

All living units shall be individually metered.

All branch circuits shall be wired with copper wire. If aluminum wiring is used in other locations, connections shall be made with appropriate compression fittings.

System design shall meet or exceed the recommendations of the Mass. Building Code.

Disposals shall be wired through a receptacle to provide a means of disconnecting when servicing.

Metal stud partitions shall be grounded in accordance with the Massachusetts Electric Code.

In conformance with the Massachusetts Building Code all exterior lighting shall have an automatic means for nonoperation when natural lighting is available.

(*) All light switches, electrical outlets, thermostats, and other controls should be installed in compliance with provisions of the Federal Fair Housing Act and the Architectural Access Board.

In accordance with the Energy Conservation Section of the Massachusetts State Building Code, only "I.C." (insulation compatible) rated recessed lighting fixtures are accepted in top floors of insulated ceilings.

It is recommended that the Architect review materials and colors (exterior and interior) subsequent to closing. This review should include such items as cabinet work, flooring, lighting fixtures, wall finishes, masonry/siding, roofing, etc. It is the architect's responsibility to schedule this review prior to the ordering of any finish items. Compliance with the HUD MPS does not necessarily imply MHFA approval.

It is understood that by signing below the above recommended items are included in their entirety in both the Outline Specifications and the Closing Specifications and that the contract amount includes all above items.

SIGNED ______________________ DATE ______________________
(Architect)

______________________ DATE ______________________
(Developer)

______________________ DATE ______________________
(Architect)

TABLE 2 MINIMUM WEIGHT & DENSITY REQUIREMENTS FOR TYPE 1 - SINGLE & MULTI-FAMILY HOUSING

CLASS	- TEXTURE	NYLON				POLYPROPYLENE				POLYESTER		ACRYLIC		WOOL	
		BCF*		STAPLE		BCF		STAPLE		STAPLE		STAPLE			
		WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY
Class 1 Moderate Traffic	A. LEVEL OR TEX. LOOP	20	3300	** 22	3450	20	3600	24	4000			33	3350	35	3450
	B. MULTILEVEL	23	2850			24	3400					38	3050	40	2950
	C. PLUSH	24	2600	24	2600							40	2850	42	2700
	D. TWIST	24	2950	24	2950					28	3250	37	3050	38	2950
	E. LEVEL CUT & LOOP	24	3200	24	3200	24	3600			32	3700	37	3300	38	3200
	F. CUT PILE HEAT SET PLIED	24	625	24	625					32	1550	40	2300	42	2400
	G. CUT PILE HEAT SET SINGLES			24	1150					32	2300				
Class 2 Heavy Traffic	A. LEVEL OR TEX. LOOP	26	4000	** 28	4200	26	4350	28	5000			39	4800	40	4550
	B. MULTILEVEL	30	3500			32	3600					45	4200	46	4000
	C. PLUSH	32	3350	32	3350							46	4000	48	3850
	D. TWIST	32	3350	32	3350					36	3900	45	4200	46	4000
	E. LEVEL CUT & LOOP	28	3850	28	3850	28	4000			39	4100	43	4500	45	4350
	F. CUT PILE HEAT SET PLIED	30	1440	30	1440					40	1920	45	2600	46	2650
	G. CUT PILE HEAT SET SINGLES			32	1530					40	2900				

*BCF BULK CONTINUOUS FILAMENT ** FOR BLEND PURPOSES ONLY

TABLE 3 MINIMUM WEIGHT & DENSITY REQUIREMENTS FOR TYPE II ELDERLY & CARE FACILITIES

CLASS	TEXTURE	NYLON				POLYPROPYLENE				POLYESTER		ACRYLIC		WOOL	
		BCF*		STAPLE		BCF		STAPLE		STAPLE		STAPLE			
		WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY	WT.	DENSITY
Class 1 Moderate Traffic	A. LEVEL OR TEX. LOOP	20	3300	** 22	3450	20	3600	24	4000			33	3350	35	3450
	B. MULTILEVEL														
	C. PLUSH	24	2600									40	2850	42	2700
	D. TWIST	24	2950	24	2950					28	3250	37	3050	38	2950
	E. LEVEL CUT & LOOP	24	3200	24	3200	24	3600			32	3700	37	3300	38	3200
	F. CUT PILE HEAT SET PLIED	24	1250	34	1250					32	1500	40	2300	42	2400
	G. CUT PILE HEAT SET SINGLES			24	1250					32	2300				
Class 2 Heavy Traffic	A. LEVEL OR TEX. LOOP	26	4000	** 28	4000	26	4350	28	5000			39	4800	40	4550
	B. MULTILEVEL														
	C. PLUSH	28	4000	28	4000										
	D. TWIST	32	3500	32	3500					36	3950	48	4200	50	4000
	E. LEVEL CUT & LOOP	28	3850	28	3850	28	4000			39	4100	43	4500	45	4350
	F. CUT PILE HEAT SET PLIED	32	3600	32	3600										
	G. CUT PILE HEAT SET SINGLES														

*BCF BULK CONTINUOUS FILAMENT ** FOR BLEND PURPOSES ONLY

9/20/84 dt.fl.guarantee.wp

Massachusetts Housing Finance Agency
50 Milk St.
Boston, Ma. 02109

Attn. Design and Technical Officer

Re:-----------------------

Gentlemen:

(Owner) requests the use of (proposed material) in lieu of (original material) for (application) in the above referenced project.

(Owner) understands that the use of this building component is contrary to the recommendation of MHFA. (Owner) further understands that if in the opinion of MHFA the component fails to perform its intended function for its normal life during the life of the mortgage that (Owner) will guarantee that they will provide labor and material to insure adequate performance of the component for the remaining life of the mortgage.

(Owner) further promises that in the event it is called upon to perform this guarantee, the funds required shall be obtained from assets or revenue of the partnership other than rental revenue and (Owner) shall not be eligible for any increase in the mortgage amount to cover such cost.

The owner further understands that if this request is made subsequent to loan closing that a credit is due to the project account for the cost differential between the item used and the item proposed.

Very truly yours,

(general partner)

MASSACHUSETTS HOUSING FINANCE AGENCY

EQUAL OPPORTUNITY/AFFIRMATIVE ACTION CONTRACT FOR CONSTRUCTION

DATE: MHFA NO:

DEVELOPMENT-NAME AND ADDRESS:

OWNER-NAME AND ADDRESS:

DEVELOPER-NAME AND ADDRESS:

GENERAL CONTRACTOR-NAME AND ADDRESS:

CONSTRUCTION CONTRACT TERM: __________

CONSTRUCTION CONTRACT COST: $ ________

MINORITY HIRING GOAL (See Section IV): ________

MINORITY CONTRACT GOAL AMOUNT (See Section VII): $ ________

MINORITY CONTRACT GOAL PERCENTAGE (See Section VII): ________

WOMAN HIRING GOAL (See Section IV): ________

WOMAN CONTRACT GOAL AMOUNT (See Section VII): $ ________

WOMAN CONTRACT GOAL PERCENTAGE (Section VII): ________

Whereas, the Massachusetts Housing Finance Agency, pursuant to the project documents, has the right to approve the general contractor selected by the owner, and

Whereas, pursuant to Executive Orders 227 and 237, the Massachusetts Housing Finance Agency has the obligation to assure compliance with certain affirmative action goals and requirements by the owner/developer and the general contractor; and

Whereas, the establishment of goals and carrying out of a program of affirmative action in the awarding of subcontracts and in the hiring of laborers provide a means of assuring compliance with the above-mentioned executive orders, and as a condition of Massachusetts Housing Finance Agencys' approval of the general contractor, now therefore the parties enter into the following contract on this _____day of _____19____.

I. DEFINITIONS:

"Affirmative Action"	Affirmative steps to ensure equality of opportunity in the internal affairs of state government, as well as in their relations with the public, including those persons and organizations doing business with the Commonwealth.
"Minority"	Blacks, Hispanics, Asian Americans and Native Americans. [State Office of Minority and Women Business Assistance Definition].
"Agency"	The Massachusetts Housing Finance Agency.
"Developer"	Any firm designated by the owner to act as the entity responsible for the development, execution and implementation of plans and specifications, approved by the Agency, and for which the Agency has granted a mortgage to the owner.
"Owner"	The person(s) who are granted a mortgage(s) by the Agency for the purpose of construction of housing units and attendant facilities.
"General Contractor"	Any firm designated by the owner to act as the entity responsible for the construction or rehabilitation of a project, approved by the owner, and for which the Agency has granted a mortgage to the owner.
"MBE"	Minority Business Enterprise - a firm that is at least 51% minority owned, managed and controlled. [State Office of Minority and Women Business Assistance Definition.]
"WBE"	Woman Business Enterprise - a firm that is at least 51% female owned, managed and controlled. [State Office of Minority Women Business Assistance Definition.]

"Liaison Committee"	*A committee formed by the Agency to assist in the monitoring of affirmative action goals during construction.*
"EO Director"	*The Director of the Equal Opportunity Division of the Agency.*
"Goals"	*The numerical percentages for the employment of minorities and women and the award of M/WBE contracts.*
"Compliance Standard"	*Compliance standard means "every possible measure", as used herein, and is the standard by which affirmative action efforts are to be evaluated. This means the same as "best efforts" with respect to the actions taken by the owner/developer and includes the obligation for the owner/contractor to provide the Agency with evidence of its compliance efforts.*
"Collective Bargaining Agreements"	*A collective bargaining agreement is an agreement between a contractor and a labor union or organization. Contractors will not be required to violate their lawful collective bargaining agreements to meet the affirmative employment goals in the hiring of journeymen, apprentices, trainees, advanced trainees, and laborers. The contractor and subcontractors shall rely on referrals generated not only under collective bargaining agreements, but also from other sources such as minority or women community referral organizations.* ***M.G.L., Chapter 149*** *- Massachusetts General Law, chapter 149 S44F, defines and lists those classes of work which shall be used in the construction of housing developments.*

II. ***PARTIES TO THIS CONTRACT***

The parties to this contract include the mortgagor (hereinafter the "owner"), the developer, the general contractor (herein after referred to as "contractor") and the Massachusetts Housing Finance Agency (the "Agency")

III. ***AGREEMENT***

During the performance of this contract, the general contractor and all subcontractors will be hereinafter collectively referred to as the "contractor" unless otherwise mentioned individually. The assignees, and successors in interest agree as follows:

A. *To abide by the provisions of federal executive order 11246, state Executive Orders 227 and 237, as amended, and to incorporate the order in all non-exempt contracts entered into;*

B. *Not to discriminate against any employee, or applicant for employment because of race, color, religion, creed, national origin, age, sex or handicapped status. This includes, but is not limited to: advertising; recruitment; layoff; termination; rates of pay, or other forms of* *compensation; conditions or privileges of employment; and selection for apprenticeship. The contractor shall post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the agency setting forth the law of the Commonwealth (M.G.L. Chapter 151(b) and Executive Orders 227 and 237);*

C. *To undertake affirmative action, using every possible measure designed to eliminate any discriminatory barriers due to the effects of past and/or present discrimination in the terms and conditions of employment and the utilization of minority/women owned businesses. Such affirmative action shall entail positive and aggressive measures to ensure equal opportunity in the areas of hiring, upgrading, demotion or transfer, recruitment, layoff or termination, rate of compensation, in-service or apprenticeship training programs, and the utilization of minority and women owned businesses; and*

D. *To attach this contract and include it by reference into the general construction contract and all subcontracts for construction and/or services. Each subcontractor or supplier/bidder shall be bound to the same equal opportunity and affirmative action obligations as the contractor.*

IV. *GOALS*

A. *On this development, the general contractor and subcontractors shall maintain:*

1. *A minority hiring percentage goal of _%. This goal represents the ratio of minority employee work hours to total employee work hours in each trade ; and*

2. *A woman hiring percentage goal of __%. This goal represents the ratio of woman employee work hours to total employee work hours in each trade.*

These goals will include, but not be limited to, those "classes of work" listed in section 44F of chapter 149 of the M.G.L.

B. *For the hiring of minority and woman workers, apprentices, trainees and advanced trainees, the contractor shall rely on the following referrals from:*

1. *Traditional sources utilized by the construction industry; and*

2. *Agencies designated by the Agency or the Liaison Committee. (If one is designated by the Agency for this project).*

V. *EQUAL OPPORTUNITY REQUIREMENTS*

A. *The Agency, as it may deem necessary, shall require the formation of a Liaison Committee. The Liaison Committee shall be composed of* *representatives from the developer, the owner, the Agency and minority and woman community organizations. As appropriate, the Agency may also request a representative from the State Office of Minority and Women Business Assistance (**SOMWBA**) to serve on the Committee.*

B. The contractor, and the designated equal employment opportunity officer for the construction company, shall recognize the Liaison Committee as a resource to assist with the achievement of affirmative action goals. All matters relating to the recruitment, referral, employment and training of minorities and women will be referred to the Liaison Committee.

VI. REPORTING

A. The contractor shall prepare projected workforce tables on a quarterly basis. These tables shall be broken down by week, including the workhours required in each trade. Copies of all tables shall be furnished to the Agency and the Liaison Committee a week in advance of the commencement of the period covered. The tables are to be submitted as updated. ***No contractor is to initiate work on the site until compliance with this section has been completed.***

B. Records of employment referral orders shall be prepared by the contractor and shall be made available to the Agency and to the Liaison Committee on request.

C. The contractor shall prepare employment reports on forms developed by the Agency (Agency Form 181-1). These reports shall list the hours worked in each trade by each employee. Each employee shall be identified as minority, non-minority or woman.

D. Copies of the employment reports shall be submitted to the Agency (when applicable, to the Liaison Committee) on or before the 10th day of each month or at such other time required by the Agency, together with the requisition for funds.

VII. STANDARDS OF COMPLIANCE AND APPROVAL

A. The contractor shall take affirmative action using every possible measure to involve minority and woman subcontractors (M/WBEs) in all sub-bid work. This affirmative action shall cover both pre-bid and post-bid periods. While bids are in preparation, the contractor shall notify SOMWBA, or its designee, of all work, services and supplies for which the contractor intends to negotiate bids. The contractor shall take affirmative action to reach the percentage and dollar amounts set forth below:

1. *MBE goal______% or $__________*
2. *WBE goal______% or $__________*

a. *In the event these goals are not met, the contractor must demonstrate that minority or women-owned firms are not available to bid competitively in the applicable sub-trade classification. Where a subcontractor awards work to a lower-tier subcontractor, he or she shall be subject to this provision, and the same percentage goals applicable to the general contractor shall apply to him/her.*

b. *The general contractor and all sub-contractors shall, at the request of the Equal Opportunity Director or his/her designee furnish a copy of a letter of intent to award to the Agency's Equal Opportunity Division.*

c. *In order for credit to be allocated toward achievement of the MBE or WBE goal, the minority or woman subcontractor must actually perform the work under the subcontract. Any work which is awarded by the minority or woman subcontractor to an entity which does not qualify as an MBE or WBE goal will not be counted toward the goal.*

d. *As soon as practical, but no later than the preconstruction conference, the contractor shall submit to the Equal Opportunity Division, in writing or by telephone, but confirmed in writing, the following information:*

    1. *Efforts made to solicit bids from minority/women subcontractors;*

    2. *The dollar amounts of the bids awarded to minority/women subcontractors;*

    3. *The reason for declining the bid of a minority or woman subcontractor, if the affirmative action goal(s) have not been met; and*

    4. *Total dollar amount of awards and minority/women subcontractors percentages of the total awards, together with copies of executed letters of intent that have been sent to all subcontractors.*

e. *Prior to the initial construction loan closing, the E.O. Director shall make a determination of the general contractors' good faith compliance efforts to achieve affirmative action requirements. The following information shall be submitted:*

    1. *Firms to which subcontracts have been awarded*

(identify M/WBEs);

2. *Firms to which executed letters of intent have been completed. (Identify M/WBEs); and*

3. *Firms with which verbal commitments have been made (identify M/WBEs).*

VIII. RIGHT OF ACCESS

A designee of the Agency and a designee of the Liaison Committee (when applicable) shall each have the right of access to the construction site.

IX. COMPLIANCE WITH REQUIREMENTS

The contractor will comply with the provisions of Executive Orders 227 and 237, of the Governor's Code of Fair Practices, and of chapter 151B, as amended, of the MGL. Each of the referenced executive orders and statutes are incorporated herein and made a part of this contract.

X. NON-DISCRIMINATION

The contractor, in the performance of all work after award and prior to completion of the contract work, will not illegally discriminate in employment practices, or in procurement of materials and rentals of equipment.

XI. COMPLIANCE INFORMATION AND REPORTS

A. The contractor will provide all information and reports required by the owner or the Agency, and will permit access to its facilities and any books, records, accounts and other sources of information relative to the requirements of this contract. Where information required is in the exclusive possession of another who fails, or refuses to furnish this information, the contractor shall certify this fact to the owner, and the Agency, and shall detail efforts to obtain the information.

B. Whenever the owner or developer submits a requisition to the Agency for a progress payment for work performed, the requisition shall include copies of affidavits and the completed minority and/or women business progress payment reports (Attachment MHFA form 181-3A).

C. The contractor's monthly staffing report form 181-1 shall be submitted to the Agency by the 10th day of each month for work completed the previous month. (Attachment MHFA form 181-1).

XII. PENALTIES FOR NON-REPORTING

A. The Agency's Executive Director may, at his/her sole discretion, impose a *penalty of $50.00 per day on the owner/developer for each day that he/she fails to submit its MHFA M/WBE progress payment report form 181-3a with the monthly requisition form. Each owner/developer shall have ten (10) days in which to submit Agency form 181-3A, following notice from the Agency's Equal Opportunity Director, before the $50.00 per day penalty is imposed by the Agency. The fifty dollars ($50.00) per day will be deposited in an escrow account for each day of non-compliance for each violation. If the report(s) have not been received by the Agency on the 45th day following the imposition of the penalty for failure to report, the funds collected for the penalty will be retained by the Agency in the form of liquidated damages and deducted from the project account.*

B. If the owner/developer, through the contractor, fails to submit MHFA's form 181-1 by the 10th day of each month, that firm shall be subject to a $50.00 per day penalty for each day that the form has not been filed. Each owner/developer shall have ten (10) days in which to submit form 181-1, following notice from the Agency's Equal Opportunity Director, before the $50.00 per day penalty is imposed by the Agency. The fifty dollars ($50.00) per day will be deposited in an escrow account for each day of non-compliance, for each violation. If the report(s) have not been received by the Agency on the 45th day following the imposition of the penalty for failure to report, the funds in the escrow account will be retained by the Agency, in the form of liquidated damages, and deducted from the project account.

XIII. DETERMINATION OF NON-COMPLIANCE WITH MINORITY/WOMEN HIRING GOALS AND GOALS FOR MINORITY/WOMEN BUSINESS ENTERPRISES UTILIZATION

A. Whenever the Agency's Equal Opportunity Director believes that the contractor, or any of its subcontractors, may not be operating in compliance with the affirmative action provisions of this contract, the Equal Opportunity Director shall conduct an investigation, or cause such an investigation to be conducted.

B. If the Equal Opportunity Director determines that the owner/developer, through the contractor, has taken every possible measure to achieve the affirmative action requirements under this contract, he/she shall find the contractor to be in compliance. The EO Director shall issue the finding in writing, setting forth a summary of the facts and reasons on which the finding is based. Copies of the finding and summary shall be sent to the owner/developer and the contractor.

C. An owner, developer or contractor shall be found to be in preliminary noncompliance when its reports demonstrate that it is not meeting the goals established at the start of construction and has not made its best faith efforts in the process. A written notice will be sent by the Equal Opportunity Director to the owner/developer, and the contractor, requesting them to meet with Equal Opportunity Director, or his/her designee, to *formulate a corrective action plan. The affected party(ies) shall have thirty days to negotiate an acceptable corrective action plan, upon receipt of notice of non-compliance. The plan, among other elements, shall include a timetable, acceptable to the Equal Opportunity Director, indicating the date by which compliance shall be achieved. The plan shall also include any other provision which the Equal Opportunity Director, at his/her sole discretion, deems advisable. The owner/ developer and the contractor shall comply in full with the provisions of an Equal Opportunity Director's approved plan. It is the responsibility of the Equal Opportunity Director, or his/her designee, to monitor the quality of the owner/developer and the contractors implementation of the corrective action plan. In making a compliance determination, the Equal Opportunity Director must make a finding of the responsiveness to the corrective action plan of the owner/developer and the contractor, with regard to:*

1. *Quality of effort; and*

2. *Numerical performance.*

D. The EO Director shall issue a written decision regarding the manner in which the owner/developer and the contractor have adhered to the corrective action plan and whether they are in compliance with the terms of the plan. The decision will set forth a summary of the facts and reasons on which the determination is based. Copies of the decision shall be sent to the owner/developer and contractor.

E. If the Equal Opportunity Director finds cause to believe that the owner/developer and contractor have not adhered to the corrective action plan or are otherwise in noncompliance, the Equal Opportunity Director shall, in writing, notify the owner/developer and the contractors of this determination. If the Equal Opportunity Director determines that the owner/developer and the contractor have not adhered to the corrective action plan, and are in noncompliance, he/she shall, with notice to the owner/developer and the contractor, ***recommend to the Executive Director of the Agency the imposition of the penalties for noncompliance allowed in this contract and such funds should be deposited in an escrow account until said owner/developer and the contractor are in compliance with this contract. The escrowed funds shall be deducted from loan funds available for the development.***

XIV. PENALTIES FOR NONCOMPLIANCE

The amount to be escrowed shall be determined as follows:

If ten (10) days after notification by the Equal Opportunity Director that the owner/developer, through the contractor are in preliminary noncompliance with the requirements of this contract, no more than one tenth of one percent (1%) of the contract price, per violation, for each week that the *contractor has failed or refused to comply shall be held in escrow.*

XV. RIGHT OF APPEAL

A. Within five (5) days after receiving notice that funds are to be placed in escrow pursuant to this contract, the owner/developer and the contractor, , may appeal to the Agency's Executive Director pursuant to the provisions of Executive Order no. 227, As amended.

B. In addition to the penalties that may be imposed by the Agency already herein stated, the Agency may, after the issuance of the final report of non-compliance, impose one or more of the following penalties on the owner/developer and the contractor as it may deem appropriate, to attain full and effective enforcement of this contract:

1. *The Agency may exclude the owner/developer and the contractor from participation in any Agency financed programs for a specified period of time, commensurate with the seriousness of the breach of equal opportunity/affirmative action construction provisions, generally not to exceed five (5) years.* ***However, the Agency may exclude a party for an indefinite period because of a deliberate and willful, violation of this contract.***

2. *The Agency may disqualify the owner/developer and the contractor temporarily from participation in the Agency financed programs until the Agency, at its sole discretion, is satisfied that sufficient steps have been implemented to remedy violations of the equal opportunity/affirmative action construction provisions.*

XVI. RELEASE OF ESCROWED FUNDS

A. No funds placed in escrow by the Agency's Executive Director, in accordance with the recommendation of the Equal Opportunity Director, shall be released by the Agency to the owner/developer, until the Agency's Executive Director has consulted with the Equal Opportunity Director to determine that the owner/developer through the contractor, as applicable, are in compliance with this contract.

B. If, when the work under this contract is substantially complete, the Agency's Executive Director has not released funds placed in escrow pursuant to this provision, such funds shall be deemed liquidated damages, released from the escrow to the Agency and not distributed to the owner.

XVII. OWNER/DEVELOPER OBLIGATIONS

Before the legal entity, which is to be the owner/developer, has been formed, the developer entity may have agreed to the provisions of this contract. In such cases, the obligations of the developer must be assumed by the owner. In *instances where there is a consultant operating as a developer, both the owner and the developer must agree to comply with the provisions of the contract. The primary responsibility for complying with this contract lies with the owner.*

A. In addition to any other obligations of the owner/developer under any preceding section, the owner/developer agrees to monitor, ensure and enforce full compliance by its contractor and all subcontractors with this contract. The owner/developer agrees to fumish, or to cause its contractors, subcontractors, or vendors, as applicable, to fumish such information as the Equal Opportunity Director may require for review of such compliance, and to allow authorized representatives of the Equal Opportunity Director full access to the job site and to employees working on the job site. The owner/developer agrees to take such action with respect to any contractor or subcontractor, as the Agency may direct, as a means of enforcing this contract.

B. During the term of this contract, the owner/developer agrees to include the provisions of the contract in every contract, subcontract, or purchase order entered into under the contract, and in any requests for proposals, or similar solicitations made in connection with such contracts, subcontracts or purchase orders.

C. When the Agency determines that the contract work is substantially completed, the owner/developer shall deliver to the Equal Opportunity Director a sworn certification indicating that all affirmative action requirements of this contract have been fulfilled, according to the provisions of the contract. The Equal Opportunity Director may request from the owner/developer such additional information as he/she deems necessary to demonstrate such compliance. Prior to payment of the final requisition, the Equal Opportunity Director shall determine whether the owner/developer has complied with the applicable requirements of this contract. If the Equal Opportunity Director finds that the owner/developer has not so complied, the Equal Opportunity Director may recommend that the Agency's Executive Director withhold said payment from the owner/developer for the following:

1. *Any amounts which the Equal Opportunity Director previously recommended be suspended or placed in escrow; and*
2. *Liquidated damages in amounts up to $2,000, per violation, for each week that the owner or any contractor or subcontractor has not complied.*

XVIII. GENERAL PROVISIONS

A. The sections of this contract are severable, and, if any of these sections shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any of the remaining sections.

B. *All decisions and determinations by the Equal Opportunity Director shall be final and not subject to contest except as provided on appeal to the Agency's Executive Director by the owner/developer and the contractor. The Agency's Executive Director, upon consideration of the facts in the case, may revise, amend, alter or rescind the determination made by the Equal Opportunity Director.*

C. *The owner/developer and the contractor shall not enter into any agreement, formal or informal, written or verbal, which would directly or indirectly have the effect of reducing, modifying, or otherwise changing the terms and conditions contained in this contract.*

D. *The owner/developer and the contractor and all subcontractors agree to fully comply with rules, regulations and the Agency's policies which have been adopted and promulgated from time to time. Notice of any changes in the Agency's rules, regulations or policies, which impact on this contract, shall be provided to the owner/developer and the contractor.*

The parties hereto have executed this equal opportunity/affirmative action contract for construction as of the date first above written under seal by their duly authorized representatives.

OWNER:

BY ____

DEVELOPER:

BY ____

CONTRACTOR:

BY ____

MASSACHUSETTS HOUSING FINANCE AGENCY:

BY: *WILSON HENDERSON, DIRECTOR OF EQUAL*
OPPORTUNITY DIVISION:

*DATE*____

MASSACHUSETTS HOUSING FINANCE AGENCY
CERTIFICATION FORM

OFFICIAL USE
MHFA ONLY

SUBCONTRACTOR SELECTION PROCESS

Project Name and Number ____________________

Location ____________________

TRADE	Name of Sub-Contractor	Bids Solicited, Date	Verbal Commitment Y/N	Date Selected	$ Volume Accepted	Min. Yes/ No	Fem. Yes/ No	# Min. Bids Rec'd	# Fem. Bids Rec'd	Total # Bids Rec'd	# Minority/Female Bids By Referral Source			
											SOMBA	CAB	MHFA	OTHER
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

Attach reasons for rejecting minority/female bids by trade # from above

DOLLAR VOLUME

1. Total Dollars Avail for Subcontract ____________________
2. Dollars Prev. Alloc. to Subcontract ____________________
3. Dollars to Alloc this Request ____________________
4. Balance ____________________

Minority/Woman Subcontractors

	MBE	WBE
5. Goal		
6. $ of Prev Min./Wom. Subcontracts		
7. $ to Min./Wom. this Request		
8 Balance		
9 % Minority/Woman Goal Achieved		

Signature ____________________

Contractor (Name & Title) ____________________

Date ____________________

Signature ____________________

MHFA Approval (Name & Title) ____________________

Date ____________________

EXHIBIT B

CERTIFICATE OF BORROWER AND CONTRACTOR
(BOND ISSUANCE)

The undersigned, ______________________________ and ____________________________ are the Owner ("Owner") and the General Contractor ("General Contractor"), respectively, of the project known as _____________________________, in ______________, __________ (the "Project") which will be financed in part with a construction and permanent first mortgage loan (the "Mortgage Loan") to the Owner funded with the proceeds of certain bonds issued by the Massachusetts Housing Finance Agency (the "Bonds") and sold to the American Federation of Labor and Congress of Industrial Organizations Housing Investment Trust (the "Trust"). The Trust has agreed to purchase the Bonds funding the Mortgage Loan upon the satisfaction of certain terms and conditions. In order to induce the Trust to purchase the Bonds funding the Mortgage Loan, the Owner and Contractor DO HEREBY JOINTLY AND SEVERALLY CERTIFY to the Trust as follows:

The Owner and Contractor will contract for the construction of the Project only with contractors and subcontractors which employ only employees for on-site work who are represented by unions affiliated with the local Building and Construction Trades Council, AFL-CIO, having jurisdiction in the area and/or The Building and Construction Trades Department, AFL-CIO. The Owner and Contractor will cause their respective contractors and subcontractors to contract for the construction of the project only with contractors and subcontractors which employ only employees for on-site work who are represented by unions affiliated with the local Building and Construction Trades Council, AFL-CIO, having jurisdiction In the area and/or The Building and Construction Trades Department, AFL-CIO.

IN WITNESS WHEREOF, the undersigned have executed this Certificate on the ____ day of ______ 199__.

OWNER:

____

a ________________________________

By: ______________________________

GENERAL CONTRACTOR:

____

a ________________________________

BOSTON
REDEVELOPMENT
AUTHORITY

Raymond L. Flynn
Mayor

One City Hall Square
Boston, MA 02201
(617) 722-4300

THE PRECONSTRUCTION PACKET

FOR COMPLIANCE WITH THE

BOSTON RESIDENTS JOBS

POLICY

BOSTON REDEVELOPMENT AUTHORITY
33 THIRD AVENUE
CHARLESTOWN NAVY YARD
CHARLESTOWN, MA 02129
CONTRACT COMPLIANCE
(617) 722- 4300 ext. 5543

BOSTON REDEVELOPMENT AYTHORITY

PRE-CONSTRUCTION AGENDA

DATE____________________________

PROJECT/LOCATION____

PRE-CONSTRUCTION SIGN IN/DEVELOPERS, GENERAL AND SUB-CONTRACTORS

1. INTRODUCTION:

   a. Boston Resident Jobs Policy
   b. Minority And Womens Business Requirements
   c. Race and Ethnic Standards
   d. Sample EEO Letter
   e. Quarterly Report
   f. Employment Plan/Submission Prior to Work Commencement
   g. Weekly Utilization Report/Weekly Submission
   h. Boston Residency Verification
   i. New Employee Verification Form
   J. Start Work/Stop Work Notification
   k. Work Force Documentation/ EDIC/JCS or UNION HALL
   l. Minority Business Utilization Forms
      15% (non impact) 30%(Impacted Areas)Participation

      Womens Business Utilizatin Forms
      5% Participation (city Wide)
   m. Walk on site applicants
   n. Trade code for weekly utilizations

2. Data to be secured fron General Contractor

   List of all Sub-Contractors / Denote Suppliers

BOSTON RESIDENT JOBS POLICY
HISTORY & EMPLOYMENT STANDARDS

It is the policy of the City of Boston to comply with all laws and regulations concerning the hiring of workers in the construction process regarding federally assisted, city sponsored, and privately funded developments within the City limits.

The purpose of this document is to provide compliance information to developers and contractors so that they may more easily achieve compliance regarding the Boston Construction Employment Standards.

HISTORY

Chapter 30 of the ordinance of 1983 established the Boston Resident Jobs Policy.

The Mayor's Executive Order of July 12, 1985, entitled The Executive Order Extending the Boston Resident Jobs Policy, requires the Developer to prepare, and submit, and the authority to approve, a construction employment plan.

The Boston Employment Commission has been established by an ordinance passed by City Council on July 30, 1986 and signed by the Mayor of the City of Boston. The Commission was created for the purpose of ensuring that findings may be determined with respect to compliance of the Boston Resident Jobs Policy in a manner that is comprehensive, consistent, and fair for all parties involved.

EMPLOYMENT STANDARDS

The Boston Resident Construction Employment Standards as set forth in the Mayor's Executive Order of July 12, 1985 entitled The Executive Order Extending the Boston Resident Jobs Policy, attached hereto as Exhibit A and adopted by the Boston Redevelopment Authority on July 26, 1985. Specifically, the Executive Order requires that the Developer's Construction Employment Plan shall ensure that on a craft basis for construction employment for the Project, the following Boston Resident Construction Employment Standards are met:

(1) at least fifty (50) percent of the total employee worker-hours in each trade shall be by bona-fide Boston Residents.

(2) at least twenty-five (25) percent of the total employee worker hours in each trade shall be by minorities; and

(3) at least ten (10) percent of the total employee worker hours in each trade shall be by women.

For the purpose of this Plan, employees shall include persons filling apprenticeship and on-the-job training position.

EXCERPT FROM THE BOSTON RESIDENT JOBS POLICY
BOSTON EMPLOYMENT COMMISSION ORDINANCE

BEST FAITH EFFORTS

Developers and Contractors may rely on traditional referral methods in the hiring of journeymen, apprentices, advanced trainees and helpers. Developers and contractors also shall implement affirmative action steps which include the following to the extent that such steps do not conflict with any collective bargaining agreement.

CONTRACTOR'S BEST EFFORTS

1. The contractor shall designate and shall require each subcontractor to designate an individual to serve as a compliance officer for the purpose of pursuing the Boston Resident Construction Employment Standards.

2. Prior to the start of construction, the contractor and each subcontractor then selected shall meet with appropriate representatives of the construction trade unions, representatives from the Boston Redevelopement Authority, and the awarding or contracting authority for the purpose of reviewing the Standards and the estimated employment requirements for construction activity over the construction period of the Covered Project.

3. Whenever any person involved in the construction of a Covered Project makes a request to a union hiring hall, business agent or contractor's association for qualified workers, the requestor shall ask that those qualified applicants referred for construction positions be referred in the proportions specified in the Boston Resident Construction Employment Standards and shall, further, contain a recitation of such standards. However, if the requesting party's workforce composition at any time falls short of any one or more of the proportions specified in the Standards, the requesting party shall adjust his or her request so as to seek to more fully achieve the proportions as specified in the Standards. If the union hall, business agent or contractor's association to whom a request for qualified employees has been made fails to fully comply with such a request, the requesting party's compliance officer shall seek written confirmation that there are insufficient employees in the categories specified in the request and that such insufficiency is documented on the unemployment list maintained by the hall, agent or association. Copies of any confirmation so obtained shall be forwarded to the Commission. Copies of any requests for qualified employees made at a time that the requesting party's workforce composition falls short of any one or more such Standards shall be forwarded contemporaneously to the Skills Bank.

BEST EFFORTS (continued)

4. All persons applying directly to the Contractor or any subcontractor for employment in construction of a Covered Project who are not employed by the party to whom application is made shall be referred by said party to the Boston Redevelopment Authority and a written record of such a refferal shall be made by said party, a copy of which shall be sent to said Boston Redevelopment Authority.

5. Contractors shall maintain a current file of the names, addresses, telephone numbers of each Boston resident, minority and woman who has sought employment with respect to a Covered Project, or who was referred to the contractor by the Boston Redevelopment Authority but was not hired. The contractor shall maintain a record of the reason any such person was not hired. (Amendment inclusion 9/26/86). If the construction of a Covered Project is subject to any union collective bargaining agreements, it shall be required that the employee complies with any lawful union security clauses contained in such agreement. (Amendment inclusion 9/26/86 ends)

6. The contractor shall in a timely manner complete and submit to th Commission a projection of the workforce needs over the course of construction of the Covered Project. Such a submission shall reflect the needs by a trade for each month of the construction process.

7. The contractor shall obtain from each worker employed in the construction of the Covered Project, a sworn statement containing the worker's name and place of residence.

8. One week following the commencement of construction of the project, and each week thereafter until such work is completed, the contractor shall complete and submit to the Boston Redevelopment Authority for the week just ended a report which reflects (a) for each employee, the employee's name, place of residence, race, gender, trade and total number of workers hours he or she worked, and (b) the total worker hours of its total workforce.

9. The contractor and each subcontractor shall maintain records reasonably necessary to ascertain compliance with the steps detailed in clauses (1) through (8) hereof for atleast one year after the issuance of a Certificate of Occupancy for the Covered Project. In its review of records of a construction project submitted to demonstrate compliance with these steps, the Commission shall take into consideration any affirmative action outreach programs and affirmative action job training particular trades participating in the Covered Project.

DEVELOPER'S BEST EFFORTS

1. Developers of the Covered Project shall incorporate in every general construction contract or construction management agreement an enumeration of the Standards and shall impose a responsibility upon any such general contractor or construction management to take all steps emumerated in clauses (1) through (9), and to incorporate such Standards in all subcontracts and impose upon all subcontractors the obligation to take such steps.

2. The developer shall meet with the contractor no less frequently than weekly throughout the period of construction of the Covered Project to review the contractor's compliance with such Standards and steps. The developer shall maintain minutes of such meetings and shall forward a copy of such minutes to the Boston Redevelopment Authority within ten (10) days of such meeting.

3. The developer shall comply with the escrow deposits as requirements of the Boston Employment Commission.

ATTACHMENT 1 - SAMPLE LETTER INFORMING NEW SUBCONTRACTORS OF BOSTON RESIDENT JOBS POLICY OBLIGATIONS.

Dear

The following procedures and guidelines must be followed by all subcontractors performing work on the above referenced project. This project is subject to the Boston Resident Jobs Policy, and will be monitored by the Boston Redevelopment Authority to ensure that employment of 50% Boston residents, 25% minorities and 10% females is achieved and maintained.

1. Submit a letter to the union explaining that this project is subject to the Boston Resident Jobs Policy, which requires that employment of 50% Boston residents, 25% minorities and 10% females must be achieved on a weekly basis until completion of your contract with this company.

2. As your company gets ready to hire workers from the local union, keep in mind that all requests made by your job representative in your office must be done in writing. All requests must include: The name of the representative making such request, name of persons s/he contacted at union hall, date of contact and action taken by union representative.

3. A meeting is to take place with union business agent before your company starts any type of work on this project.

4. Records must be kept by your office for all walk-in applicants. Records should include the name, address, and telephone number of the applicant, the position for which the applicant applied, whether the applicant is resident, minority or female, and action taken by your office.

5. A meeting will be called by the General Contractor and the Boston Redevelopment Authority to discuss what other steps will be taken to help your office comply with these requirements.

Implementation of the above guidelines will help to make this project a success.

Sincerely,

MINORITY AND WOMEN BUSINESS ENTERPRISE DEVELOPMENT

Executive Order of December 17, 1987

Boston Redevelopment Authority, Board Vote of Adoption date April 21, 1988.

The Mayor of Boston adopted this Executive Order to encourage, assist and maximize opportunity for minority and women owned businesses to participate in the City's contracting for goods, services and construction.

A. Requirements:

1. CONSTRUCTION: For the eligible contract dollars of each construction related contract:

   a. a minimum of 15% shall be awarded to Minority Business Enterprises.

   b. a minimum of 30% shall be awarded to Minority Business Enterprises for an impacted area.

   c. a minimum of 5% shall be awarded to Women Business Enterprises.

RACE AND ETHNIC STANDARDS

1) **Caucasian** - A person having origins in any of the original peoples of Europe, North America, or the Middle East.

2. **Black** - A person having origins in any of the black racial groups of Africa.

3. **Hispanic** - A person of Mexican, Purerto Rican, Cuban, Central of South American or other Spanish/Indian cultural origins (this category is not to include persons of European or Arbic ancestry).

4. **Asian or Pacific Islands** - A person having origins in any of the original peoples of the Far East, Southeastern Asia, the Indian Subcontinent, or the Pacific Islands. This area includes China, Japan, Korea, the Philippine Islands, Samoa, India, Pakistan, Bangladesh, Sri Lanka, Nepal, Sikkim, and Shutan.

5. **American Indian or Alaskan Native** - A person having origins in any of the original peoples of North America, and who maintains cultural identification through tribal affiliation of community recognition.

NOTE: Ethnic Classifications 2-5 are based on section one, (11) of the 1986 ordinance establishing the Boston Resident Jobs Policy as defined by the U.S. Bureau of the Census and Promulgated by the federal office of Management and budget.

Areas That Comprise The City of Boston

Allston
Charlestown
East Boston
Jamaica Plain
North End
Roslidnale
South Boston
West Roxbury

Brighton
Dorchester
Hyde Park
Mattapan
Readville
Roxbury
South End

SAMPLE EEO LETTER

TO ALL EMPLOYEES:

THIS IS TO INFORM YOU THAT THIS COMPANY HAS A POLICY OF EQUAL OPPORTUNITY EMPLOYMENT AND EMPLOYS PEOPLE WITHOUT REGARD TO SEX, RACE, COLOR, CREED OR NATIONAL ORIGIN.

AS PART OF THIS PROGRAM OF EQUAL OPPORTUNITY, IT IS REQUESTED THAT YOU REFER ANY QUALIFIED MINORITY GROUP PEOPLE THAT YOU KNOW WHO ARE SEEKING EMPLOYMENT TO (NAME OF INDIVIDUAL). IN ADDITION, EMPLOYEES WILL BE CONSIDERED FOR PROMOTION WITHOUT DISCRIMINATION AND THE SAME APPLIES TO ANY LAY-OFFS AND TERMINATION OF EMPLOYMENT.

IF YOU HAVE ANY QUESTIONS REGARDING THE IMPLEMENTATION OF THIS POLICY, PLEASE CONTACT (NAME OF INDIVIDUAL, WOULD BE SAME AS ABOVE), THE COMPANY'S EQUAL OPPORTUNITY OFFICER, AND (HE OR SHE) WILL BE GLAD TO ASSIST YOU.

SINCERELY,

NAME ______________________
TITLE ______________________

QUARTERLY WORK FORCE PROJECTION TABLE

PROJECT ____

CONTRACTOR ____________________ ADDRESS ____________________

CONTACT ____________________ PHONE NUMBER ____________________

QUARTER BEGIN DATE ______________ QUARTER END DATE ______________

WEEK ENDING														
TRADE														
TOTAL EMPLOYEES														
RESIDENT EMPLOYEES														
MINORITY EMPLOYEES														
FEMALE EMPLOYEES														
TRADE														
TOTAL EMPLOYEES														
RESIDENT EMPLOYEES														
MINORITY EMPLOYEES														
FEMALE EMPLOYEES														
TRADE														
TOTAL EMPLOYEES														
RESIDENT EMPLOYEES														
MINORITY EMPLOYEES														
FEMALE EMPLOYEES														

COMPANY OFFICIAL'S SIGNATURE ______________ DATE ____________________

BOSTON REDEVELOPMENT AUTHORITY / COMPLIANCE AND ENFORCEMENT DIVISION

WEEKLY UTILIZATION REPORT

AWARD DEPT.

PERCENT COMPLETED

PROJECT DATE OF COMPLETION

WEEK OF: ____________ TO: ____________

Name of Contractor ( ) or Sub-Contractor ( )

Address

Phone Number

CODES:
Caucasian 1.
Black 2.
Hispanic 3.
Asian 4.
Other 5.

Project/Location

Project or Contract No.

															Only necessary for Federal Contracts					
Social Security # Name & Address	Sex M/F	Work Classification	Ethnicity (See Codes)	OT ST	S	M	T	W	TH	F	S	Total Hours	Rate of Pay	Gross-Amount Earned	FICA	With-holding Tax	State w/h	Union	Total	Net Wages Paid For Week
					Hours Worked Each Day															
				O																
				S																
				O																
				S																
				O																
				S																
				O																
				S																
				O																
				S																

Name & Title

Signature

Total

Date

Contractors/Sub-Contractors should forward this form to:

BOSTON REDEVELOPMENT AUTHORITY
CONTRACT COMPLIANCE DEPARTMENT
1 CITY HALL SQUARE
BOSTON, MA 02201

The wilful falsification of any of the above statements may subject the contractor or sub-contractor to civil or criminal prosecution. See section 1001 of title 10 and section 231 of title 31 of the United States Code.

I, ______________________ ______________________
(Name of signatory party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by ______________

______________________ on the ______________________
(Contractor or subcontractor) (Building or work)

______________; that during the payroll period commencing on the ______________

day of ____________, 19 ______, and ending the ____________ day of ____________, 19 ______, all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

______________________________ ____________ from the full
(Contractor or subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. 276c), and described below:

____

____

____

____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rages contained in any wage determination incorporated into the contract; that the classification set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) Where Fringe Benefits Are Paid to Approved Plans, Funds, or Programs

☐ In addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed ber[illegible]of such employees, except as noted in Section 4(c) below.

(b) Where Fringe Benefits Are Paid in Cash

☐ Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in Section 4(c) below.

(c) Exceptions

EXCEPTION (CRAFT)	EXPLANATION

Remarks

Name & Title	Signature

The wilful falsification of any of the above statements may subject the contractor or subcontractor to civil or criminal prosecution. See Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

BOSTON REDEVELOPMENT AUTHORITY

COMPLIANCE AND ENFORCEMENT DIVISION

RESIDENCY VERIFICATION FORM

Project: ______________________________

Contractor or
Subcontractor: ______________________________

To be completed by Employee:

Name of Employee: ______________________________

Employee's Residential
Address: ______________________________

I hereby state under the pains and penalties of perjury that the foregoing information is true.

Signature
of Employee: ______________________________

Date: ______________________________

To be completed by Contractor or Subcontractor:

The foregoing information was verified by the following:

Driver's License _____
Utility Bill _____

The foregoing information was not verified: _____

Signature of Contractor
or Subcontractor: ______________________________

Date: ______________________________

PLEASE INCLUDE A COPY OF ONE OF THE ABOVE DOCUMENTS AS PROOF OF RESIDENCY

COMPANY NAME:______________________________

NEW EMPLOYEE VERIFICATION FORM

NAME: ____________________

ADDRESS: ___________________

SOCIAL SECURITY NUMBER: __________

DATE ARRIVED ON JOBSITE: __________

CHECK AS APPLICABLE:

______ NEW HIRE

IF NEW HIRE:

______WORK FORCE REQUEST FORM IS ATTACHED

______TRANSFER

IF TRANSFERED:

FROM WHERE: ____________________

______FOREMAN

______ WORKING

______ NON WORKING

______BOSTON RESIDENT

IF BOSTON RESIDENT:

______ RESIDENCY VERIFICATION FORM IS ATTACHED

This form is to be submitted for each employee, whether he/she is hired from the union hall or transfered from another job within your Company. IF "New Hire" is checked, the Work Force Request Form (made to the Union Hall) must be attached. If "Boston Resident" is checked, the Residency Verification form must be attached.

START WORK NOTIFICATION FORM

Project: ____

TO:

BOSTON REDEVELOPMENT AUTHORITY
38 THIRD AVENUE
CHARLESTOWN NAVY YARD
CHARLESTOWN, MA 02129
CONTRACT COMPLIANCE

ATTN: ______________________ DATE: ______________

To Whom It May Concern: Re: START WORK NOTIFICATION

Please be advised that ______________________ below-listed Subcontractor will be starting work in the field at the above project.

Subcontractor	
Address City, State, Zip	
Work to be Performed	
Approximate Start Date	
Approximate Completion Date	
Employing Construction Trade(s):	
Anticipated Average Daily Workforce	

Sincerely,

General Contractor

STOP WORK NOTIFICATION FORM

Project: ____

TO:

BOSTON REDEVELOPMENT AUTHORITY
38 THIRD AVENUE
CHARLESTOWN NAVY YARD
CHARLESTOWN, MA 02129
CONTRACT COMPLIANCE

ATTN: ________________________ DATE: ________________

To Whom It May Concern: Re: STOP WORK NOTIFICATION

Please be advised that ________________________ below-listed Subcontractor has ceased work in the field at the above project.

Subcontractor	
Trade(s) Employed:	
Reason for Work Termination:	

Sincerely,

General Contractor

WORK FORCE REQUEST DOCUMENTATION

FROM: ______________________ DATE REQUESTED: ________

TO: ______________________ DATE REQUIRED: ________

LOCAL # ______________________

REQUEST MADE TO: ______________________
NAME TITLE

I. REQUESTS: TRADE ______________________

TOTAL	RESIDENT	MINORITY	FEMALE

REQUEST MADE BY: ______________________
NAME

II. REFERRALS:

TOTAL	RESIDENT	MINORITY	FEMALE

III. TRANSFERS: ______________________
TRANSFERRED FROM

1) ______________________

2) ______________________

3) ______________________

PLEASE INCLUDE WORKER'S NAME, ADDRESS, SEX, ETHNICITY, AND SSN#.

(1177B, rev. 11/1/89) % Required ______

CITY OF BOSTON
MINORITY BUSINESS UTILIZATION FORM

BOSTON REDEVELOPMENT AUTHORITY
38 THIRD AVENUE
CHARLESTOWN NAVY YARD
CHARLESTOWN, MA 02129
CONTRACT COMPLIANCE

Name and Number of Project: ______

Total Dollar Amount of Base Bid: ______

Name of General Bidder: ______

Address: ______

Telephone #: ______

Listed below is the MBE (Minority Business Enterprise), the services and/or supplies it will provide and the approximate amount of money it will receive. The General Contractor and this MBE intend to work together on the above named project in accordance with the terms of the Minority Participation Section of the City of Boston "Boston Resident Jobs Policy and Minority/Women Business Participation Compliance Contract Supplement for Bid Award Construction Contracts". **If the MBE is not listed in the City of Boston Directory, a Certification Application completed by the non-certified MBE must be filed with the Minority/Women Business Unit of the Compliance and Enforcement Division at the Mayor's Office of Jobs and Community Services within five (5) business days of the receipt of general bids.**

Name: ______	Scope of work to be performed and/or supplies to be provided
Address: ______	______
______	______
Telephone #: ______	$ Amount: ______

SIGNED UNDER THE PAINS AND PENALTIES OF PERJURY. A PRINCIPAL OF THE MBE AND THE GENERAL CONTRACTOR MUST SIGN THIS FORM. IF THE GENERAL CONTRACTOR IS SIGNING ON BEHALF OF THE MINORITY BUSINESS, AUTHORIZATION TO DO SO SIGNED AND DATED BY A PRINCIPAL OF THE MBE MUST BE ATTACHED TO THIS FORM.

General Contractor	Minority Business Enterprise
Signed: ______	Signed: ______
Title: ______	Title: ______
Date: ______	Date: ______

*Please attach additional forms if other MBE Enterprises are needed.
NOTE: This Form must be submitted by the General Contractor to the M/WBE Unit of the Compliance and Enforcement Division within five (5) business days after the opening of general bids.

FINAL MINORITY BUSINESS UTILIZATION FORM
(MBU-FPR)

Project Name: ____________________

Project Number: ____________ Contract Price: ____________

General Contractor Information

(a) Name of General Contractor: ____________________

(b) Address: ____________________

(c) Telephone Number: ____________________

Minority Business Information

(a) Name of Minority Business Enterprise: ____________________

(b) Address: ____________________

(c) Telephone Number: ____________________

Please state the total dollar amount received by the Minority Business Enterprise on the above named project $__________, and attach copies of cancelled checks as proof of payment.

I hereby certify that the above listed amount is correct to the best of my knowledge.

____
Signature:

____
Title

____
Date

Doc:0090B
Rev:9/87

(1177B, rev. 11/1/89) % Required______

CITY OF BOSTON
BOSTON REDEVELOPMENT AUTHORITY
38 THIRD AVENUE
CHARLESTOWN NAVY YARD
CHARLESTOWN, MA 02129
CONTRACT COMPLIANCE
WOMEN BUSINESS UTILIZATION FORM

Name and Number of Project:______________________________

Total Dollar Amount of Base Bid:______________________________

Name of General Bidder:______________________________

Address:______________________________

Telephone #:______________________________

Listed below is the WBE (Women Business Enterprise), the services and/or supplies it will provide and the approximate amount of money it will receive. The General Contractor and this WBE intend to work together on the above named project in accordance with the terms of the Women Participation Section of the City of Boston "Boston Resident Jobs Policy and Minority/Women Business Participation Compliance Contract Supplement for Bid Award Construction Contracts". **If the WBE is not listed in the City of Boston Directory, a Certification Application completed by the non-certified WBE must be filed with the Minority/Women Business Unit of the Compliance and Enforcement Division at the Mayor's Office of Jobs and Community Services within five (5) business days of the receipt of general bids.**

Name:____________________ Scope of work to be performed and/or supplies to be provided

Address:____________________ ______________________________

____________________ ______________________________

Telephone #:____________________ $ Amount:______________________________

SIGNED UNDER THE PAINS AND PENALTIES OF PERJURY. A PRINCIPAL OF THE WBE AND THE GENERAL CONTRACTOR MUST SIGN THIS FORM. IF THE GENERAL CONTRACTOR IS SIGNING ON BEHALF OF THE WOMEN BUSINESS, AUTHORIZATION TO DO SO SIGNED AND DATED BY A PRINCIPAL OF THE WBE MUST BE ATTACHED TO THIS FORM.

General Contractor	Women Business Enterprise
Signed:____________________	Signed:____________________
Title:____________________	Title:____________________
Date:____________________	Date:____________________

*Please attach additional forms if other WBE Enterprises are needed.
NOTE: This Form must be submitted by the General Contractor to the M/WBE Unit of the Compliance and Enforcement Division within five (5) business days after the opening of general bids.

CITY OF BOSTON

FINAL WOMEN BUSINESS UTILIZATION FORM

(MBU-FPR)

Project Name: ____________________

Project Number: ____________________ Contract Price: ____________________

General Contractor Information

(a) Name of General Contractor: ____________________

(b) Address: ____________________

(c) Telephone Number: ____________________

Wowen Business Information

(a) Name of Women Business Enterprise: ____________________

(b) Address: ____________________

(c) Telephone Number: ____________________

Please state the total dollar amount received by the Women Business Enterprise on the above named project $____________, and attach copies of cancelled checks as proof of payment.

I hereby certify that the above listed amount is correct to the best of my knowledge.

____
Signature:

____
Title

____
Date

PROJECT: ______________________________

APPLICANT DISPOSITION FORM

TO DOCUMENT WALK-ON APPLICANTS

DATE: __________ SUBCONTRACTOR ______________________

APPLICANT NAME: ____________ MIN __ RES __ FEM __

ADDRESS: __________________ TELEPHONE #: ________

POSITION APPLIED FOR: ______________________________

RECRUITMENT SOURCE:

_____ OFF THE STREET _____ JCS JOBS BANK REFERRAL

_____ OTHER (PLEASE SPECIFY) __________

RESULTS:

_____ HIRED

_____ NOT HIRED REASON: _____________

_____ REFERRED TO UNION RESULT: _____________

_____ REFERRED TO SUBCONTRACTOR ___ HIRED ___ NOT HIRED

REASON NOT HIRED: ________________________

ALL REFERRALS REQUIRE A FOLLOWUP PHONE CALL EITHER TO THE LOCAL UNION JOBS BANK, AND OR SUBCONTRACTOR TO WHOM THE REFERRAL WAS MADE TO:

CONTACT PERSON _____________

FOLLOW-UP RESULTS: ______________________________

CONTRACT COMPLIANCE TRADE CODES
FOR PAYROLL REPORTING

Trade Name	Type Name
Asbestos Worker	Asbestos Worker
Bricklayer	Bricklayer
Carpenter	Carpenter
Cement Finisher	Cement Mason
Compressor Operator	Equipment Operator
Curbsetter/Paver	Laborer
Dock Builder	Dock Builder
Electrician	Electrician
Engineer	Miscellaneous
Equipment Operator	Equipment Operator
Elevator Const(Mech)	Elevator Construction (Mech)
Glazier	Glazier
HVAC Engineer	Miscellaneous
Iron Worker	Iron Worker
Laborer	Laborer
Stone Mason	Bricklayer
Mechanic	Miscellaneous
Oiler	Equipment Operator
Painter	Painter
Piledriver	Piledriver
Pipefitter	Pipefitter
Plasterer	Plasterer
Plumber	Plumber
Roofer	Roofer
Sandblaster	Painter
Sheetmetal Worker	Sheetmetal Worker
Steamfitter	Pipefitter
Surveyor	Miscellaneous
Insulator	Carpenter
Superintendant	Miscellaneous
Truck Driver	Truck Driver
Tuck Pointer	Bricklayer
MRBLE/TILE FIN.(HLP)	Marbel/Tile
Terrazzo Worker	Bricklayer
Marble Tile Worker	Bricklayer
Waterproofer	Roofer
Carpet Layers	Floor Coverers
Floor Layers	Floor Coverers
Blaster	Laborer
Asphalt Raker	Laborer
Driller	Laborer
Steel Worker	Iron Worker

Sprinkler Fitter	Sprinkler Fitter
Cement Laborer	Laborer
Mason Tender	Laborer
Pumpman	Laborer
Caulker	Bricklayer
Field Engineer	Miscellaneous
Technician	Miscellaneous
Lineman	Line Constructor
Equip.Maintenance	Miscellaneous
Splicer	Electrician
Groundman	Line Constructor
Utilty Operator	Miscellaneous

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 PROJECT DESCRIPTION:

A. The Project consists of the construction of a new structure of approximately 110,000 gross square feet containing 88 residential rental apartment units and associated commercial spaces on a three-quarter acre urban site at 888 Washington Street, Boston, MA, as shown on Contract Documents prepared by Lawrence K. Cheng and Associates, Inc., Architect, dated 3 September 1992.

B. Briefly and without limitation on the contract documents, the Work consists of the construction of a new ten, four, and three-story steel frame structure of construction classification Type 2B and Type 2C as indicated. Landscaping, complete utility connections, paving and other site improvements are required as part of the Work.

1. The Work includes site preparation, utility connections, and lndscaping; cast-in-place concrete slabs, grade beams and pile caps on driven precast piles; brick masonry veneer and EIFS wall finish on steel studs; structural steel, open web steel joists, and steel deck and concrete floors, single ply membrane roofing, interior finishes, residential kitchen appliances, electric elevators, plumbing, fire protection, heating, ventilating, and air conditioning; electrical systems, lighting, and communication-alarm- signal systems.
2. The work shall be performed in accordance with the following general codes, regulations, and standards, with which the Contractor shall be familiar. Additional regulatory requirements are referenced in the individual Sections:

    a. The Consolidated Massachusetts State Building Code, incorporating architectural, structural, elevator, mechanical, electrical, plumbing, and fire protection regulations.
    b. The City of Boston Fire Code.
    c. The Americans with Disabilities Act (ADA).
    d. The US Department of Housing and Urban

Development's Minimum Property Standards (MPS).
   e. The Massachusetts Housing Finance Agency's design and construction guidelines.
   f. Other City of Boston regulation and ordinances.

C. Unit Prices: Unit prices are solicited for the items of work as descibed in Section 01025.

D. Alternates: The Owner requests that Contractors include prices for two alternates for interior finishes. Alternates are detailed in Section 01030.

E. Existing Conditions are shown on the drawings and specifications to the best knowledge of the Owner. The Owner, however, cannot guarantee the correctness of the information shown and assumes no responsibility therefor.

   1. In submitting a bid, the Contractor warrants that he has visited the site and verified all exisiting conditions.
   2. The City of Boston Public Facilities Department has issued a contract for demolition of the existing six story masonry structure on site. This work will be performed by others prior to start of construction on this Contract. In general, the work to be performed by others (not work of this Contract) consists of the following:

      a. Demolition and removal of above ground structure and debris.
      b. Below grade foundation walls and slab will be cleaned and left in place.
      c. The site, or a portion thereof, will be fenced.

1.3 FUNDING AGENCY REQUIREMENTS:

A. General: This project is being funded in part by the City of Boston, the AFL-CIO Housing Investment Trust, Neighborhood Housing Trust, the Massachusetts Executive Office of Communities and Development, and funds admininstered by the Massachusetts Housing Finance Agency (MHFA). These agencies stipulate as a condition of the Contract certain provisions which are established in the Supplementary Conditions, including the following:

   1. Minimum requirements for minority, women, and community-based hiring and set asides for Subcontractors.
   2. Establishing affirmative action and equal opportunity programs in accordance with indicated requirements.
   3. Minimum wage rates based on prevailing wages.
   4. The provision of an all-union labor force on this project.
   5. Maintaining and reporting requirements as required to verify compliance with the above.

B. Construction Procedures: The Contractor shall be familiar with MHFA construction procedures, including applications for payment, submittal reviews, and other contract administration requirements. Not all of these requirements may be specifically noted, and are included here by general reference.

1.4 WORK UNDER OTHER CONTRACTS:

A. The City of Boston has contracted others to reconstruct the public ways and sidewalks enclosing the site, including the new Pine Street extension at the south property line. This work will occur concurrently with or subsequent to the Work of this Contract.

B. Restoring existing sidewalks where damaged by construction operations under this Contract as required to maintain safe passage is included in the Contract.

1.5 CONTRACTOR USE OF PREMISES:

A. General: During the construction period the Contractor shall have full use of the site for construction operations. The Contractor's use of the premises is limited only by the Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the project.

1. Confine operations to areas within Contract limits indicated. Property beyond areas in which construction operations are indicated are not to be disturbed.
2. Keep sidewalks and perimeter streets clear at all times, except as approved by officials having jurisdiction. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site and to comply with City ordinances and regulations.
3. Disposal of Waste Materials: Do not dispose of organic waste, construction debris, or hazardous materials on site, either by burial or by burning.

    a. Method of disposal of contaminated soil encountered during operations is specified in Section 02___.

1.6 OWNER OCCUPANCY:

A. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building, prior to total Substantial Completion provided that such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. A Certificate of Substantial Completion will be executed for each specific portion of the Work to be occupied prior to Owner occupancy.
2. Obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
3. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy the Owner will provide operation and maintenance of mechanical and electrical systems in occupied portions of the building.

1.7 CONTRUCTION SCHEDULE:

A. The Contractor is advised that time is of the essence of this Contract, as indicated in the General Conditions.

1. It is understood that the work is to be carried through to completion with the utmost speed consistent with good workmanship.

B. As a Condition of the Contract, the Owner requires a Certificate of Occupancy for this project to be issued not later than 31 December 1993.

1.8 INTENT OF DOCUMENTS:

A. It is the intent of the Contract Documents to include all work necessary for the proper execution of the Work by the Contractor. The Contract Documents are complementary, and what is require by one shall be as binding as if required by all.

B. In cases of conflict between Contract Documents or between Contract Document and referenced standards, codes, and regulations, **the provision requiring the greater material quantity or level of performance shall apply.** No request for additional payment or time will be approved for work required by any of the Contract Documents; referenced standards, codes and regulations; or work which may reasonably be inferred as required for proper completion thereof.

C. In cases of conflict between drawings, the following order of precedence shall apply:

1. Large-scale drawings or details.
2. Small-scale drawings.
3. Schedules.

D. In cases of conflict between drawings and specifications as to type or quantity of materials or products, the specifications shall take precedence.

E. The above requirements notwithstanding, seek clarification from the Architect in case of conflict between locations of items.

END OF SECTION 01010

SECTION 01025 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for unit prices.

1. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.
2. The unit price represents the cost in place of the unit of measure and includes all necessary material, general conditions costs, overhead, profit and applicable taxes.
3. The stated unit price represents the cost to the Owner for the addition of the indicated unit of quantity to the Work. Where quantities are deleted from the Work, the deletion will occur at 85 percent of the scheduled values.

B. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.

1. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 UNIT PRICE SCHEDULE

A. Item No. 1 - Excavation and Disposal of Contaminated Soil:

1. Description: Excavation and disposal of contaminated soil at a Massachusetts Department of Environmetal Protection approved Massachusetts Sanitary Land Fill Site located within the Commonwealth of Massachusetts incorporating all ancillary costs as specified in Section 02220, "Handling Contaminated Soil".
2. Unit of Measurement: Cubic yard of material excavated.

B. Item No. 2 - Additional Fill:

1. Description: Purchase, deliver, place, and compact acceptable borrowed fill as specified in Section 02200, "Earthwork", to replace removed contaminated soil.
2. Unit of Measurement: Cubic yard of material placed.

C. Item No. 3 - Foundation Piles:

1. Description: Furnish and install reinforced precast piles as specified in Section 02350, "Foundation Piles."
2. Unit of Measurement: Linear foot of piles driven.

D. Item No. 4 - Preaugering for Foundation Piles:

1. Description: Preaugering as required for reinforced precast piles as specified in Section 02350, "Foundation Piles".
2. Unit of Measurement: Linear foot of augering required.

END OF SECTION 01025

SECTION 01027 - APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

B. MHFA Requirements: This project is being funded in part by funds administered by the Massachusetts Housing Finance Agency (MHFA), which stipulates as a condition of the contract certain reporting requirements, formats, and certifications associated with each application for payment. These requirements are incorporated in this Section by general reference and may not be specifically noted. The Contractor warrants that he is familiar with MHFA requirements.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, List of Subcontracts, and Submittal Schedule.

1.3 SCHEDULE OF VALUES:

A. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

1. Submit the Schedule of Values to the Architect at the earliest feasible date, but in no case later than 7 days before the date scheduled for submittal of the initial Application for Payment.

B. Format and Content: Use MHFA's standard trade breakdown format as a guide to establish the format for the Schedule of Values.

1. Identification: Include the following Project identification on the Schedule of Values:
    a. Project name and location.
    b. Name of the Architect.
    c. MHFA Project number.

   d. Contractor's name and address.
   e. Date of submittal.

2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:

   a. Generic name.
   b. Material dollar value.
   c. Labor dollar vaue.
   d. Total dollar value.
   e. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports.
4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
5. General Conditions Cost: Show line items for direct costs, and indirect costs to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.

1.4 APPLICATIONS FOR PAYMENT:

A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner from MHFA funding.

   1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.

B. Payment Application Times: Each progress payment date is as indicated in the Agreement.

C. Payment Application Forms: Use AIA Document G 702 as the cover sheet for Application for Payment. Other forms to be attached include but are not limited to:

   1. Standard MHFA trade breakdown forms.
   2. MHFA waiver of lien form.
   3. MHFA MBE/WBE participation reports.
   4. Certificates of payment of Subcontractors.

D. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:

1. List of subcontractors.
2. List of principal suppliers and fabricators.
3. Schedule of Values.
4. Contractor's Construction Schedule (preliminary if not final).
5. Schedule of principal products.
6. Submittal Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's proposed professional engineers.
9. Copies of building permits
10. Copies of authorizations and licenses from governing authorities for performance of the Work.
11. Initial progress report.
12. Report of pre-construction meeting.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.

E. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

F. Administrative actions and submittals that shall proceed or coincide with this application include:

1. Occupancy permits and similar approvals.
2. Warranties (guarantees) and maintenance agreements.
3. Test/adjust/balance records.
4. Maintenance instructions.
5. Meter readings.
6. Start-up performance reports.
7. Change-over information related to Owner's occupancy, use, operation and maintenance.
8. Change of door locks to Owner's access.
9. Final cleaning.
10. Application for reduction of retainage, and consent of surety.
11. Advice on shifting insurance coverages.
12. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

G. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:

1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Substantial Completion.
3. Assurance that unsettled claims will be settled.
4. Assurance that Work not complete and accepted will be completed without undue delay.

5. Transmittal of required Project construction records to Owner.
6. Certified property survey.
7. Proof that taxes, fees and similar obligations have been paid.
8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish and similar elements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION OF APPLICATIONS FOR PAYMENT:

A. Preliminary Review: At the monthly review meeting established for reviewing requisitions, Contractor shall present to Architect, Owner, MHFA's representative, and others as may be appropriate a proposed application for payment indicating level of completion claimed for each line item in trade breakdown form. After review and consultation with those present, final application values will be determined by the Architect. The Contractor shall then revise preliminary application to concur with the values assigned at the review meeting.

B. Application Preparation: Complete every entry on all forms, including notarization and execution by person authorized to sign legal documents on behalf of the Contractor. Incomplete applications will be returned without action.

  1. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

C. Transmittal: Submit 9 executed copies of each Application for Payment to the Architect by means ensuring receipt within 24 hours.

  1. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.
  2. Owner's time period for payment of amounts due established in the Contract shall begin on the day requisitions are approved by the Architect.

END OF SECTION 01027

SECTION 01030 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for Alternates.

B. Schedule: A "Schedule of Alternates", prices for which are to be included in the Contractor's Bid Form, is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods necessary to achieve the Work described under each Alternate.

C. Definition: An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.

1. The dollar amount indicated in the Bid Form for each alternate shall be the total adjustment to the base bid for each alternate, including General Conditions costs, overheads, and profit.
2. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

D. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES:

A. Alternate No. 1: State the amount to be DELETED from the Base Bid to change residential bathroom floor and base finish shown as unglazed ceramic mosaic tile to sheet vinyl. Delete floor and base tile, stone threshold, and waterproofing membrane work specified in Section 09300, "Tile", and replace with sheet vinyl, vinyl base and edge strips specified in Section 09650, "Resilient Flooring".

B. Alternate No. 2: State the amount to be DELETED from the Base Bid to change window treatment indicated as horizontal blinds to roller blinds. Delete applicable parts of Section 12500, "Window Treatment", and replace with the following:

1. Products:

   a. Roller Blinds: Unit consisting of tear-proof woven fiberglass coated with fade-resistant, flame-retardant vinyl plastic shade; wood roller with heavy duty springs and positive locking mechanism; 1-1/4 inch by 5/16 inch hard wood slat sewn into shade hem with cotton cord and pull attached.
   b. Provide mounting brackets for installation at window head as recommended by manufacturer.

2. Installation: Install per manufacturer's instructions to operate properly and smoothly without catching.

END OF SECTION 01030

SECTION 01040 - PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

B. Nothing in this Section shall in any way limit the Contractor's responsibility for Coordination as established in the Generel Conditions.

1.2 SUMMARY:

A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

1. Coordination.
2. Administrative and supervisory personnel.
3. General installation provisions.
4. Cleaning and protection.

B. Related Work Specified Elsewhere:

1. Field engineering and surveying services are specified in Section 01050, "Field Engineering".
2. Progress meetings, coordination meetings and pre-installation conferences are included in Section 01200, "Project Meetings".
3. Requirements for the Contractor's Construction Schedule are included in Section 01300, "Submittals".

1.3 COORDINATION:

A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

C. Each trade Contractor shall compare the drawings and specifications of their sections with those of other sections and shall report any discrepancies between them to the Architect through the Contractor, and obtain from him written instructions for alterations neccessary to properly coordinate the work.

1. The work of each trade shall be installed in consultation and cooperation with that of others.
2. Make changes in installed work, using methods specified or approved by the Architect, to install subsequent work if required by condition for proper operation.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Scheduling and coordinating testing services, including testing services furnished by the Owner.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Project Close-out activities.

1.4 SUBMITTALS:

A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the interrelationship of components shown on

separate Shop Drawings.

2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals."

B. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS:

A. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

B. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

C. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

D. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.

E. Recheck measurements and dimensions, before starting each installation.

F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

G. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

H. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Architect for final decision.

3.2 CLEANING AND PROTECTION:

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Water or ice.
5. Solvents.
6. Chemicals.
7. Heavy traffic.
8. Soiling, staining and corrosion.
9. Rodent and insect infestation.
10. Combustion.
11. Unusual wear or other misuse.
12. Contact between incompatible materials.
13. Destructive testing.
14. Excessive weathering.
15. Unprotected storage.
16. Theft.
17. Vandalism.

END OF SECTION 01040

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1. Requirements of this Section apply to mechanical and electrical installations.

1.3 SUBMITTALS:

A. Cutting and Patching Proposal: Where approval of procedures for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

1. Describe the extent of cutting and patching required and how it is to be performed.

2. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.

3. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

4. Where cutting and patching involves addition to, alteration of, or other change to structural elements, submit details and engineering calculations, stamped and certified by an Engineer licensed in the jurisdiction

where the project is being constructed, to show how reinforcement is integrated with the original structure and verifying that proposed operation complies with applicable codes.

5. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

1.4 QUALITY ASSURANCE:

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

   1. Comply with requirements of authorities having jurisdiction for shoring and safety precautions during cutting and patching work.
   2. Obtain Architect's approval of proposed operation before beginning cutting and patching structural work.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

   1. Obtain Architect's approval of proposed operation before beginning cutting and patching operational or safety related components or work.

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

3.2 PREPARATION:

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE:

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

   1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

   1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
4. Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.

3.4 CLEANING:

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01050 - FIELD ENGINEERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. General: This Section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:

1. Land survey Work.
2. Civil engineering services.
3. Structural engineering services.

1.3 SUBMITTALS:

A. Certificates: Submit a certificate signed by the Land Surveyor or Professional Engineer certifying that the location and elevation of improvements comply with the Contract Documents and requirements of local authorities and utility provider company requirements.

B. Submit the following survey plans, signed and certified by a Registered Land Surveyor, on reproducible mylar:

1. Foundation Survey: Submit 2 copies with indicated information for building department review and Owner's records.
2. Final Property Survey: Submit 3 copies of the final property survey.
3. Site Utilities: Submit 2 copies of site utility drawings and details with indicated information for provider company review and approval.

C. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of Sections "Submittals" and "Project Closeout".

1.4 QUALITY ASSURANCE:

A. Surveyor: Engage a Registered Land Surveyor registered in Massachusetts to perform land surveying services required.

B. Engineer: Engage a Professional Engineer of the discipline required, registered in the state in which the Project is located, to perform required engineering services.

PART 2 - PRODUCTS

A. Site Utility Drawings: Reproducible stamped mylars, complying with requirements of provider companies, showing locations, elevations, details, connections, and calculations, as required to obtain indicated utility connection approvals. Include hydraulic calculations and other information required for review and approval.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.

2. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.

B. Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

C. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.

1. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer and water service piping, and location of other underground utilities.

3.2 PERFORMANCE:

A. Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.

  1. Advise entities engaged in construction activities, of marked lines and levels provided for their use.

  2. As construction proceeds, check every major element for line, level and plumb.

B. Surveyor's Log: Maintain a surveyor's log of control and other survey Work. Make this log available for reference.

  1. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

    a. Include in log variations in building floor slab elevations, and deviations from plumb of vertical lines.

  2. On completion of foundation walls, major site improvements, and other Work requiring field engineering services, prepare a certified survey showing dimensions, locations, angles and elevations of construction and sitework. File with local building department officials for review and approval.

C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

D. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical Work.

E. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.

F. Final Property Survey: Before Substantial Completion, prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the Surveyor, to the effect that principal metes, bounds, lines and levels of the Project are accurately positioned as shown on the survey.

1. Recording: At Substantial Completion, have the final property survey recorded by or with local governing authorities as the official "property survey".

END OF SECTION 01050

SECTION 01095 - REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 DEFINITIONS:

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

C. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

D. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

E. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

F. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

G. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

H. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities

must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

I. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings.

J. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.2 INDUSTRY STANDARDS:

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer conflicting requirements to the Architect for resolution before proceeding.

1. Unless the Architect determines otherwise, the more stringent quantity or quality level shown or specified shall be the minimum provided or performed.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in

Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.

AA	Aluminum Association 900 19th St., NW, Suite 300 Washington, DC 20006	(202) 862-5100
AAMA	American Architectural Manufacturers Assoc. 2700 River Rd., Suite 118 Des Plaines, IL 60018	(312) 699-7310
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol St., Suite 225 Washington, DC 20001	(202) 624-5800
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI 48219	(313) 532-2600
ADC	Air Diffusion Council 230 N. Michigan Ave., Suite 1200 Chicago, IL 60601	(312) 372-9800
AGA	American Gas Assoc. 1515 Wilson Blvd. Arlington, VA 22209	(703) 841-8400
AI	Asphalt Institute Research Park Drive P.O. Box 14052 Lexington, KY 40512-4052	(606) 288-4960
AIA	American Institute of Architects 1735 New York Ave., NW Washington, DC 20006	(202) 626-7300
AISC	American Institute of Steel Construction One East Waker Drive, Suite 3100 Chicago, IL 60601-2001	(312) 670-2400
AISI	American Iron and Steel Institute 1133 Fifteenth St., NW Washington, DC 20005	(202) 452-7100
AMCA	Air Movement and Control Assoc. 30 W. University Drive Arlington Heights, IL 60004	(312) 394-0150
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018	(212) 354-3300

ARI Air Conditioning and Refrigeration Institute
1501 Wilson Blvd., 6th Floor
Arlington, VA 22209 (703) 524-8800

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
1791 Tullie Circle, NE
Atlanta, GA 30329 (404) 636-8400

ASME American Society of Mechanical Engineers
345 East 47th St.
New York, NY 10017 (212) 705-7722

ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Blvd., Suite 210
Westlake, CA 91362 (805) 495-7120

ASSE American Society of Sanitary Engineering
P.O. Box 40362
Bay Village, OH 44140 (216) 835-3040

ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103 (215) 299-5400

AWI Architectural Woodwork Institute
2310 S. Walter Reed Drive
Arlington, VA 22206 (703) 671-9100

AWPA American Wood Preservers' Assoc.
P.O. Box 849
Stevensville, MD 21666 (301) 643-4163

AWPB American Wood Preservers Bureau
P.O. Box 5283
Springfield, VA 22150 (703) 339-6660

AWS American Welding Society
550 LeJeune Road, NW
P.O. Box 351040
Miami, FL 33135 (305) 443-9353

AWWA American Water Works Assoc.
6666 W. Quincy Ave.
Denver, CO 80235 (303) 794-7711

BHMA Builders' Hardware Manufacturers Assoc.
355 Lexington Ave., 17th Floor
New York, NY 10017 (212) 661-4261

BIA Brick Institute of America
11490 Commerce Park Drive, Suite 300
Reston, VA 22091 (703) 620-0010

CISPI	Cast Iron Soil Pipe Institute 5959 Shallowford Road, Suite 419 Chattanooga, TN 37421	(615) 892-0137
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Rd. Schaumburg, IL 60173	(312) 517-1200
DHI	Door and Hardware Institute 7711 Old Springhouse Rd. McLean, VA 22102	(703) 556-3990
EIMA	Exterior Insulation Manufacturers Assoc. 30 Holley St. Wakefield, RI 02879	(401) 782-3687
FGMA	Flat Glass Marketing Assoc. White Lakes Professional Bldg. 3310 Harrison Topeka, KS 66611	(913) 266-7013
FM	Factory Mutual Research Organization 1151 Boston-Providence Turnpike Norwood, MA 02062	(617) 762-4300
GA	Gypsum Association 810 First Street, NE, Suite 510 Washington, DC 20002	(202) 289-5440
IESNA	Illuminating Engineering Society of North America 345 E. 47th St. New York, NY 10017	(212) 705-7926
IGCC	Insulating Glass Certification Council c/o ETL Testing Laboratories, Inc. P.O. Box 2042 Route 11, Industrial Park Cortland, NY 13045	(607) 753-6711
NAAMM	National Association of Architectural Metal Manufacturers 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222
NAPA	National Asphalt Pavement Assoc. Calvert Building, Suite 620 6811 Kenilworth Ave. Riverdale, MD 20737	(301) 779-4880
NCMA	National Concrete Masonry Assoc. P.O. Box 781 Herndon, VA 22070	(703) 435-4900

NEC	National Electric Code (from NFPA)	
NECA	National Electrical Contractors Assoc. 7315 Wisconsin Ave. Bethesda, MD 20814	(301) 657-3110
NEII	National Elevator Industry, Inc. 185 Bridge Plaza, North Fort Lee, NJ 07024	(201) 944-3211
NEMA	National Electrical Manufacturers Assoc. 2101 L St., NW, Suite 300 Washington, DC 20037	(202) 457-8400
NFPA	National Fire Protection Assoc. One Batterymarch Park P.O. Box 9101 Quincy, MA 02269-9101	(617) 770-3000
NKCA	National Kitchen Cabinet Assoc. P.O. Box 6830 Falls Church, VA 22046	(703) 237-7580
NRCA	National Roofing Contractors Assoc. One O'Hare Centre 6250 River Road, Suite 8030 Rosemont, IL 60018	(708) 318-6722
NSF	National Sanitation Foundation 3475 Plymouth Rd. P.O. Box 1468 Ann Arbor, MI 48106	(313) 769-8010
NWWDA	National Wood Window and Door Assoc. (Formerly NWMA) 1400 E. Touhy Ave., #G54 Des Plaines, IL 60018	(312) 299-5200
PCA	Portland Cement Assoc. 5420 Old Orchard Road Skokie, IL 60077	(312) 966-6200
PDI	Plumbing and Drainage Institute c/o Sol Baker 1106 W. 77th St., South Dr. Indianapolis, IN 46260	(317) 251-6970
RFCI	Resilient Floor Covering Institute 966 Hungerford Drive, Suite 12-B Rockville, MD 20805	(301) 340-8580
SDI	Steel Deck Institute P.O. Box 9506 Canton, OH 44711	(216) 493-7886

S.D.I.	Steel Door Institute 30200 Detroit Road Cleveland, OH 44145	(216) 889-0010
SGCC	Safety Glazing Certification Council c/o ETL Testing Laboratories Route 11, Industrial Park Cortland, NY 13045	(607) 753-6711
SIGMA	Sealed Insulating Glass Manufacturers Assoc. 111 E. Wacker Drive Chicago, IL 60601	(312) 644-6610
SJI	Steel Joist Institute 1205 48th Avenue North, Suite A Myrtle Beach, SC 29577	(803) 449-0487
SMACNA	Sheet Metal and Air Conditioning Contractors National Association P.O. Box 70 Merrifield, VA 22116	(703) 790-9890
SPRI	Single Ply Roofing Institute 104 Wilmot Rd., Suite 201 Deerfield, IL 60015	(708) 940-8800
SSPC	Steel Structures Painting Council 4400 Fifth Ave. Pittsburgh, PA 15213	(412) 268-3327
TCA	Tile Council of America P.O. Box 326 Princeton, NJ 08542	(609) 921-7050
UL	Underwriters Laboratories 333 Pfingsten Rd. Northbrook, IL 60062	(708) 272-8800
WRI	Wire Reinforcement Institute 1760 Reston Parkway, Suite 403 Reston, VA 22090	(703) 790-9790
WSC	Water Systems Council 600 S. Federal St., Suite 400 Chicago, IL 60605	(312) 922-6222

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01095

SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:

1. Pre-Construction Conference.
2. Pre-Installation Conferences.
3. Progress Meetings.

1.3 PRE-CONSTRUCTION CONFERENCE:

A. Schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: The Owner, Architect and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress including such topics as:

1. Tentative construction schedule.
2. Tentative submittal schedule.
3. Critical Work sequencing.
4. Designation of responsible personnel.
5. Procedures for processing field decisions and Change Orders.
6. Procedures for processing Applications for Payment.
7. Distribution of Contract Documents.
8. Submittal of Shop Drawings, Product Data and Samples.
9. Preparation of record documents.

10. Use of the premises.
11. Office, Work and storage areas.
12. Equipment deliveries and priorities.
13. Safety procedures.
14. First aid.
15. Security.
16. Housekeeping.
17. Working hours.

1.4 PRE-INSTALLATION CONFERENCES:

A. Conduct a pre-installation conference at the site before each construction activity where required elsewhere in the Contract Documents. The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:

    a. Contract Documents.
    b. Shop Drawings, Product Data and quality control Samples.
    c. Possible conflicts.
    d. Compatibility problems.
    e. Time schedules.
    f. Weather limitations.
    g. Manufacturer's recommendations.
    h. Acceptability of substrates.
    i. Governing regulations.
    j. Safety.
    k. Inspection and testing requirements.
    l. Required performance results.
    m. Protection.

2. Record significant discussions and agreements and disagreements of each conference, along with the approved schedule. Distribute the record of the meeting to everyone concerned, promptly, including the Owner and Architect.
3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5 PROGRESS MEETINGS:

A. Conduct progress meetings at the Project site at regularly scheduled intervals, usually weekly. Arrange a scheduled weekly meeting time the Owner and Architect. Coordinate dates of meetings with preparation of the payment request; one meeting per month will review proposed requisition as indicated in Setion 01027 "Applications for Payment".

B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

1. Contractor's Construction Schedule: At the monthly requisition review meeting, review progress in the last month. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
2. Review the present and future needs of each entity present, including such items as:

   a. Interface requirements.
   b. Time.
   c. Sequences.
   d. Off-site fabrication problems.
   e. Access.
   f. Site utilization.
   g. Temporary facilities and services.
   h. Hours of Work.
   i. Hazards and risks.
   j. Quality and Work standards.
   k. Change Orders.
   l. Documentation of information for payment requests.

D. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1. Schedule Updating: Revise the construction schedule

after each meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01200

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Shop Drawings.
5. Product Data.
6. Samples.
7. Multiple Submittals.

1.3 SUBMITTAL PROCEDURES:

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

    a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

   a. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
   b. If an intermediate submittal is necessary, process the same as the initial submittal.
   c. Allow two weeks for reprocessing each submittal.
   d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

   1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
   2. Include the following information on the label for processing and recording action taken.

      a. Project name.
      b. Date.
      c. Name and address of Architect.
      d. Name and address of Contractor.
      e. Name and address of subcontractor.
      f. Name and address of supplier.
      g. Name of manufacturer.
      h. Number and title of appropriate Specification Section.
      i. Drawing number and detail references, as appropriate.

   3. On the submittal include Contractor's certification that information has been reviewed by the Contractor and complies with Contract Document requirements. If information contained in the submittal does not comply with Contract Documents, but in the Contractor's judgement meets the intent of the Documents, identify areas of non-compliance and bring to Architect's attention.

      Submittals received without Contractor's review and certification of compliance will be returned without action.

      Submittals containing information not in compliance with the Contract Documents which has not been brought to the attention of the Architect will be considered invalid. The Architect's approval, if given, may be revoked at

any time.

C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using a transmittal form.

Submittals received from sources other than the Contractor will be returned without action.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE:

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar- chart type Contractor's construction schedule. Submit within 30 days of Contract award.

1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".
2. Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
3. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.
4. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.

C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.5 SUBMITTAL SCHEDULE:

A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule.

1. Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:
    a. Scheduled date for the first submittal.
    b. Related Section number.
    c. Submittal category.
    d. Name of subcontractor.
    e. Description of the part of the Work covered.
    f. Scheduled date for resubmittal
    g. Scheduled date the Architect's final release or approval.

B. Distribution: Following response to initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.

1.6 DAILY CONSTRUCTION REPORTS:

A. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Architect at weekly intervals:

1. List of subcontractors at the site.
2. Approximate count of personnel at the site.
3. High and low temperatures, general weather conditions.
4. Accidents and unusual events.
5. Meetings and significant decisions.
6. Stoppages, delays, shortages, losses.
7. Emergency procedures.
8. Orders and requests of governing authorities.
9. Change Orders received, implemented.
10. Equipment or system tests and start-ups.

1.7 SHOP DRAWINGS:

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. Include all information necessary for review of products and fabrication, including location of installation, adjoining construction, details, connections, and dimensions.

C. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions.
2. Identification of products and materials included.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates, patterns and similar full- size Drawings, submit Shop Drawings on sheets of one of the following sizes: 8-1/2" x 11"; 11" x 17"; or 24" x 36".
7. Initial Submittal: Submit one correctable translucent reproducible print and two blue- or black-line prints for the Architect's review; the reproducible print will be returned.
8. Final Submittal: Submit 7 blue- or black-line prints; submit more prints where required for maintenance manuals or Contractor's operations. 3 prints will be retained by the Architect and Owner; the remainder will be returned.

    a. One of the prints returned shall be marked-up and maintained as a "Record Document".

9. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.8 PRODUCT DATA:

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."

1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information.

    Where possible, provide only information relevant to the work. Product data submittals containing extraneous information will be returned without action.

2. Include the following information:

    a. Manufacturer's printed recommendations.
    b. Compliance with recognized trade association standards.
    c. Compliance with recognized testing agency standards.

   d. Application of testing agency labels and seals.
   e. Notation of dimensions verified by field measurement.
   f. Notation of coordination requirements.

3. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
4. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.
5. Submittals: Submit 7 copies of each required submittal; submit additional copies where required for maintenance manuals. The Architect and Owner will retain three, and will return the others marked with action taken and corrections or modifications required.
6. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

   a. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
   b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.9 SAMPLES:

A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed.

1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Include the following:

   a. Generic description of the Sample.
   b. Sample source.
   c. Product name or name of manufacturer.
   d. Compliance with recognized standards.
   e. Availability and delivery time, if choice of samples may result in a substantial impact on project schedule.

2. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

   a. Preliminary submittals will be reviewed and returned with the Architect's mark indicating selection and other action.

3. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken.
4. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1.10 ARCHITECT'S ACTION:

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

THE ARCHITECT'S REVIEW IS FOR DESIGN CONCEPT ONLY. DIMENSIONS, METHODS OF PRODUCTION, FABRICATION, AND ERECTION ARE THE RESPONSIBILITY OF THE CONTRACTOR.

B. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "Approved," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
2. Final-But-Restricted Release: When submittals are marked "Approved as Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
3. Returned for Resubmittal: When submittal is marked "Not Approved, Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

a. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

1.11 MULTIPLE SUBMITTALS:

A. The Architect will review for approval one submittal and if necessary one corrected resubmittal, for each component indicated.

B. Should additional reviews be required, caused by either failure or inability of the submitted product to meet requirements indicated, or submittal of a substitute product after an initial submittal, the Contractor shall compensate the Architect on an hourly basis for review of such submittals at the following rates:

1. Direct Personnel Expense X 2.50.

END OF SECTION 01300

SECTION 01400 - QUALITY CONTROL SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for quality control services.

B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

1. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
2. Inspections, test and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
3. Requirements for the Contractor to provide quality control services required by the Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 RESPONSIBILITIES:

A. Owner Responsibilities: The Owner will engage a qualified independent testing/inspection agency to perform tests and similar quality control services specified to be performed by independent agencies and not by the Contractor, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. Costs for these services are not included in the Contract Sum; the Owner will employ and pay for those services which are the Owner's responsibility.

B. Contractor Responsibilities: The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are indicated to be the Owner's responsibility. Costs for these services shall be included in the Contract Sum.

1. Retesting: The Contractor is responsible for the cost of retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
2. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:

   a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
   b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
   c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
   d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
   e. Security and protection of samples and test equipment at the Project site.

1.4 SUBMITTALS:

A. The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Architect, in duplicate, with a copy to the Contractor. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.

1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:

    a. Date of issue.
    b. Project title and number.
    c. Name, address and telephone number of testing agency.
    d. Dates and locations of samples and tests or inspections.
    e. Names of individuals making the inspection or test.
    f. Designation of the Work and test method.
    g. Identification of product and Specification Section.
    h. Complete inspection or test data.
    i. Test results and an interpretations of test results.
    j. Ambient conditions at the time of sample-taking and testing.
    k. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
    l. Name and signature of laboratory inspector.
    m. Recommendations on retesting.

1.5 QUALITY ASSURANCE:

A. Qualification for Service Agencies: Where testing is indicated as the responsibility of the Contractor, engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION:

A. General: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01400

SECTION 01500 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, dewatering, security and protection, and environmetal protection measures.

B. Temporary utilities required include but are not limited to:

1. Water service and distribution.
2. Temporary electric power and light.
3. Telephone service.
4. Storm and sanitary sewer.

C. Temporary construction and support facilities required include but are not limited to:

1. Temporary heat.
2. Field offices and storage sheds.
3. Sanitary facilities, including drinking water.
4. Temporary enclosures.
5. Hoists and temporary elevator use.
6. Temporary Project identification signs and bulletin boards.
7. Waste disposal services.
8. Rodent and pest control.
9. Construction aids and miscellaneous services and facilities.
10. Dewatering.

D. Security and protection facilities required include but are not limited to:

1. Temporary fire protection.
2. Barricades, warning signs, lights.
3. Sidewalk bridge and enclosure fence for the site.

1.3 SUBMITTALS:

A. Implementation and Termination Schedule: Submit a schedule indicating implementation and termination of each temporary utility within 15 days of the date established for commencement of the Work.

B. Environmental Protection/Environmental Impact Mitigation Program: Prior to beginning work, submit for review and approval a written report indicating proposed mitigation efforts for the following impacts:

1. Noise and vibration control.
2. Dust and airborne pollution control.
3. Protection of water resources.
4. Traffic control.

1.4 QUALITY ASSURANCE:

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building Code requirements.
2. US Government Occupational Health and Safety Administration (OSHA) regulations.
3. Commonwealth of Massachusetts Department of Labor and Industries regulations and Section 454 CMR.
4. Utility company regulations.
5. Boston Water & Sewer Commission regulations.
6. Police, Fire Department and Rescue Squad rules.
7. Environmental protection regulations, including MGL C. 111 Section 142D.

B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities."

1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.
2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS:

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of the permanent service.

B. Once permanent services are in operating condition, if approved by the Owner the Contractor may designate certain permanent facilities for use as temporary facilities, in which case, the Contractor shall:

1. Take measures to protect the used portions from deterioration or damage during use.
2. Pay all costs for operation, maintenance, cleaning, and restoration to new condition of such facilities.

C. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General: Provide new materials; if acceptable to the Architect, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.

B. Lumber and Plywood: Comply with requirements in Section 06100, "Rough Carpentry".

1. For job-built temporary shops and sheds within the construction area, provide UL labeled, fire treated lumber and plywood for framing, sheathing and siding.
2. For signs and directory boards, provide exterior type, Grade B-B High Density Concrete Form Overlay Plywood conforming to PS-1, of sizes and thickness indicated.
3. For fences and vision barriers, provide exterior type, minimum 3/8" thick plywood.
4. For safety barriers, sidewalk bridges and similar uses, provide minimum 5/8" thick exterior plywood.

C. Paint: Comply with requirements of Section 09900, "Finish Painting".

1. For job-built temporary shops, sheds, fences and other exposed lumber and plywood, provide exterior grade

acrylic-latex emulsion over exterior primer.

2. For sign panels and applying graphics, provide exterior grade alkyd gloss enamel over exterior primer.

D. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.

E. Water: Provide potable water approved by local health authorities.

F. Open-Mesh Fencing: Provide 11-gage, galvanized 2-inch, chain link fabric fencing 8 feet high with galvanized barbed wire top strand and galvanized steel pipe posts, 1-1/2" I.D. for line posts and 2-1/2" I.D. for corner posts.

2.2 EQUIPMENT:

A. General: Provide new equipment; if acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.

B. Water Hoses: Provide 3/4" heavy-duty, abrasion-resistant, flexible rubber hoses 100 ft. long, with pressure rating greater than the maximum pressure of the water distribution system; provide adjustable shut-off nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured NEMA polarized outlets to prevent insertion of 110-120 volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas where construction activities are in progress.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.

F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM or another recognized trade association related to the type of fuel being consumed.

G. Temporary Offices: Provide prefabricated or mobile units with lockable entrances, operable windows and serviceable finishes. Provide heated and air- conditioned units on foundations adequate for normal loading.

H. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material.

I. First Aid Supplies: Comply with governing regulations.

J. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.

   1. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION:

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment; comply with the company's recommendations.

   1. Arrange with the company and existing users for a time when service can be interrupted, where necessary, to

make connections for temporary services.
2. Provide adequate capacity at each stage of construction.
3. Use Charges: Cost or use charges or other backcharges for temporary facilities are not chargeable to the Owner or Architect, and will not be accepted as a basis of claims for a Change Order.

B. Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

1. Obtain service from the nearest water main, as permitted by the Boston Water & Sewer Commission. Provide a 2" meter and shut-off valve near connection to the main. Pay for water used by entities engaged in construction activities.
2. As soon as water is required at each level, extend service to form a temporary water and fire protection standpipe. Provide distribution piping and outlets so that water can be reached with a 100 foot hose length.
3. Where water pressure is inadequate, provide pumps to supply a minimum of 30 psig static pressure at the highest point. Equip pumps with surge and storage tanks to provide water uniformly at reasonable pressures.
4. Sterilization: Sterilize temporary water piping prior to use.

C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters and main distribution switch gear.

1. Connect temporary service to the power source as directed by local provider company officials. Pay for electricity used by entities engaged in construction activities.
2. Except where overhead service must be used, install electric power service underground.
3. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
4. Provide metal conduit enclosures for wiring subject to abuse and metal boxes for all wiring devices.
5. Coordinate transfer to building power distribution to avoid power outage at any time.

D. Temporary Lighting: Whenever overhead floor or roof deck has been installed, provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions, but not less than the following:

1. Provide one 200-watt incandescent lamp per 1000 square feet, uniformly distributed, for general lighting.
2. Provide one 100-watt incandescent lamp every 50 linear feet in corridors and other traffic areas.
3. Provide one lamp per story in each stairway, located to illuminate each landing and flight.

E. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period. Install telephone on a separate line for each temporary office and first aid station. Where an office has more than two occupants, install a telephone for each additional occupant or pair of occupants. Provide basic unlimited service; long distance tolls shall be borne by the user.

1. Provide a separate telephone line in the project representative's office.
2. Provide a telephone line dedicated for a facsimile machine in the field office.
3. At each telephone, post a list of important telephone numbers.
4. Install a pay-telephone station at a convenient grade-level location, for convenience of personnel.

F. Sewers and Drainage: Provide temporary connections to city sewers to remove effluent that can be discharged lawfully. If sewers cannot be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off the site in a lawful manner.

1. Do not discharge soil, construction debris, chemicals, oils, bitumens and similar contaminants that might clog sewers or pollute waterways before discharge.
2. Connect temporary sewers to the city system as directed by Boston Water and Sewer Commission officials.
3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.

G. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

H. Natural Gas: If required by construction operations, provide temporary connections to gas mains and distribution piping of sizes and pressures adequate for construction until permanent service is in use or temporary service is no longer required.

3.3 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES INSTALLATION:

A. Locate field offices, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access and to minimize disruption or inconvenience to abutters.

B. Maintain temporary construction and support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

C. Provide incombustible construction for offices, shops and sheds located within the construction area. Comply with requirements of NFPA 241.

D. Temporary Heat: Provide temporary heat required by construction activities, for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

  1. Maintain minimum temperatures in work areas as required by applicable regulations.

E. Heating Facilities: Except where use of the permanent system is authorized, provide vented self-contained LP gas or natural gas heaters with individual space thermostatic control.

  1. Use of gasoline-burning space heaters, open flame, or salamander type heating units is prohibited.

F. Field Offices: Provide well-lighted, insulated, weathertight, heated and air conditioned temporary offices of sufficient size to accommodate required office personnel at the Project site. Keep offices clean and orderly for use for small progress meetings. The field office shall be available for the use of the Contractor, Architect, Owner, and their representatives. The cost of all offices, including project representative's office, shall be borne by the Contractor. Furnish and equip offices as follows:

  1. Field Office: Provide the following minimum furnishings and equipment. Additional furnishings are at the Contractor's option.

    a. For each occupant furnish with a desk and chairs, a 2-drawer file cabinet, plan table, plan rack and a

6-shelf bookcase, and separate storage area as required for record drawings and documents.

- b. Install a telephone and a facsimile machine.
- c. Furnish a conference area with table and chairs to seat at least eight people.

2. Project Representative's Office: Separate but adjacent to the field office, with lockable door. Furnish with a desk and chairs, a 4-drawer file cabinet, drafting table, drafting stool, telephone, plan rack and a 6-shelf bookcase.
3. Equip office suite with a water cooler and private toilet complete with water closet, lavatory and mirror-medicine cabinet unit.
4. Equip office suite with a first aid kit and fire extinguisher.
5. After enclosed, finished and heated building space becomes available, the Contractor may with the approval of the Owner move field offices into the building, in which case Contractor shall bear responsibility for restoring spaces to new condition at Substantial Completion.

G. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on the site.

H. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs, but not less than indicated:

1. Locate sanitary facilities not more than 150 feet horizontally from the lowest level of any stairway and not more than three stories vertically from any floor.
2. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

I. Toilets: Install and maintain self-contained chemical toilet units.

1. Provide separate toilets for male and female personnel, with use of each suitably identified.

J. Wash Facilities: Install wash facilities supplied with potable water at convenient locations if required for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

1. Provide safety showers, eye-wash fountains and similar facilities for convenience, safety and sanitation of personnel if required by codes or regulations for the indicated construction activities.

K. Drinking Water Fixtures: Provide drinking water fountains where indicated or required by codes and regulations, including paper supply.

1. Provide containerized tap-dispenser bottled-water type drinking water units, including paper cups, where potable water service is not acceptable for drinking.
2. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7 to 13 deg C).

L. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations and similar activities.

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 square feet or less with plywood or similar materials.
3. Provide temporary weather protection at all openings as required.
4. Close openings through floor or roof decks and horizontal surfaces with load-bearing wood-framed construction.
5. Provide guardrails complying with building codes and safety regulations at all floor openings and perimeters.
6. Where temporary wood or plywood enclosure exceeds 100 square feet in area, use UL-labeled fire-retardant treated material for framing and main sheathing.

M. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

N. Temporary Elevator Use: Once permanent elevator service is installed, Contractor may use elevators for construction activities. Provide the following:

1. Measures as required to prevent elevator usage exceeding

capacity limits or other design parameters.
2. Protection as required to prevent damage to cab finishes, hoistway enclosures, and other components.
3. Protective maintenance service.
3. Extended warranty protection to maintain indicated warranty period.

O. Project Identification and Temporary Signs: Prepare project identification and other signs of the size indicated; install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage an experienced sign painter to apply graphics. The sign shall be a minimum 4 feet by 8 feet and shall include the following information. Submit proposed wording and graphics for approval before painting.

    a. Name, address, and statistics of project.
    b. Owner's name.
    c. Identification of the following organizations, including name and address: Architect; Consulting Architect; Structural Engineer; Mechanical Engineer; Electrical Engineer; Development Consultant; General Contractor.
    d. Identification of financing agencies, including but not limited to the following:

        1) "Financing Arranged by the Massachusetts Housing Finance Agency"
        2) "Additional Financing Provided by: The City of Boston/Boston Redevelopment Authority, Raymond Flynn, Mayor; Massachusetts Executive Office of Communities and Development; Neighborhood Housing Trust; and the AFL/CIO Housing Investment Trust"

2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors as follows:

    a. Signage directing visitors to field office location.
    b. Exit: Adhesive red-on white "EXIT" signage indicating locations of exit stairs from all spaces.
    c. Signage directing visitors to office where employment applications are taken, if different than field office.

P. Temporary Exterior Lighting: Install exterior yard and sign lights so that signs are visible when Work is being performed.

Q. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material in a lawful manner.

1. Disposal of unacceptable or hazardous soil materials is included as work of Division 2 sections.
2. Provide waste containers of appropriate size and location to collect and store waste materials and to prevent scattering. Open storage piles or other uncontained storage of waste is not permitted.
3. Burning or on-site disposal of waste is not permitted.

R. Rodent and Pest Control: Before deep foundation Work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be relatively free of pests and their residues at Substantial Completion. Perform control operations in a lawful manner using environmentally safe materials.

S. Temporary Staging, Scaffolding, Platforms, Stairs: Furnish, install, and maintain in safe condition temporary scaffolding, staging, platforms, and stairs more than 8 feet in height as required by construction activities.

1. Comply with building code and OSHA regulations on placement, protection and securing of fixed or movable units.
2. Take precautions to prevent temporary scaffolding, staging, and platforms from being loaded beyond their design capacity.
3. Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Provide temporary protective coverings for finished permanent stairs and stairways so finishes will be undamaged at the time of acceptance.

T. Waste Chutes: Furnish, install, and maintain temporary waste chutes serving upper floors of all areas as required. Secure to exterior of building and locate to permit disposal of rubbish directly into disposal units.

1. Use of permanent trash chute shall not be permitted.

3.4 DEWATERING:

A. General: To the extent that dewatering is not included in other sections, provide pumps, hoses, and other equipment as required to prevent surface and subsurface water from accumulating in excavations.

1. Maintain the site, excavations and construction free of standing water.
2. Provide temporary drainage where roofing systems are completed in advance of connection to storm system.

B. Pump water into city catch basins or other location as directed by officials having jurisdiction. Do not discharge on abutting property.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION:

A. Temporary Fire Protection: Install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations."

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways and other access routes for fighting fires. Prohibit smoking in hazardous fire exposure areas.
4. Provide supervision of welding operations, combustion type temporary heating units, and similar sources of fire ignition.

B. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.

C. Enclosure Fence: Upon mobilization, install an enclosure fence with lockable entrance gates. Enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs and other animals from easily entering the site, except by the entrance gates.

1. Provide open-mesh, chain-link fencing with posts set in a compacted mixture of gravel and earth.

D. Covered Walkway: Once work above the first story begins adjacent to a public way, erect a structurally adequate protective covered walkway for passage of persons along the adjacent public street. Coordinate with entrance gates, other facilities and obstructions. Comply with regulations of authorities having jurisdiction.

1. Construct using scaffold or shoring framing, waterproofed wood plank overhead decking, protective plywood enclosure walls, handrails, barricades, warning signs, lights, safe and well- drained walkways and similar provisions for protection and safe passage. Extend the backwall beyond the structure to complete the enclosure fence. Paint and maintain in a manner acceptable to the Owner and Architect.

E. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

3.6 ENVIRONMENTAL PROTECTION:

A. General: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise.

B. Before commencing work, meet with local officials, the Owner, Architect, officials from the Department of Environmental Protection, and others concerned to develop a comprehensive plan for environmental impact mitigation.

1. Based on comments of interested parties and applicable regulations, prepare a written proposal for addressing and ameliorating impacts. Submit for review and approval.

C. Noise and Vibration Control: Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

   1. Comply with City regulations for time of day and day of week during which construction activities may occur.

D. Dust and Mud Control:

   1. Provide at all time dust control measures. Vehicles entering or leaving the project transporting dust-producing materials shall be covered with tied tarpaulins, or if acceptable to local officials, wetted down.
   2. Trucks leaving excavations shall be water rinsed prior to entry to city streets to remove mud from wheels and undercarriages.
   3. All public ways adjacent to the site shall be kept free of mud and other deleterious substances. Broom and rinse as required to prevent dust or mud buildup in the area.

E. Protection of Water Resources:

   1. Drainage systems shall be protected from siltation due to mud or other deleterious substances. Periodically inspect drainage systems for the presence of substances and remove as required.
   2. Do not permit waste washings, cement laitance, chemicals, fuel oils, bitumens or other deleterious effluents from entering city drainage systems. Dispose of such materials in an approved manner.
   3. Comply with state regulations regarding the reporting and amelioration of fuel and other chemical spills.

F. Maintain environmental control facilities for the life of the contract, or until officials having jurisdiction determine that protections are no longer required.

3.7 OPERATION, TERMINATION AND REMOVAL:

A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation and similar facilities on a 24-hour day basis where required to achieve indicated results and to avoid possibility of damage.
   2. Protection: Prevent water filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

B. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.
2. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances which might impair growth of plant materials or lawns. Repair or replace street paving, curbs and sidewalks at the temporary entrances, as required by the governing authority.
3. At Substantial Completion, clean and renovate permanent facilities that have been used during the construction period, including but not limited to:

    a. Replace air filters and clean inside of ductwork and housings.
    b. Replace significantly worn parts and parts that have been subject to unusual operating conditions.
    c. Replace lamps that are burned out or noticeably dimmed by substantial hours of use.

END OF SECTION 01500

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements governing the Contractor's selection of products for use in the Project.

B. Standards: Refer to Section "Definitions and Standards" for applicability of industry standards to products specified.

1.3 DEFINITIONS:

A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms such are self-explanatory and have well recognized meanings in the construction industry.

1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

    a. "Named Products" are items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

2. "Materials" are products that are substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections such as wiring or piping.

1.4 QUALITY ASSURANCE:

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Where such an option is offered and product selected, furnish the selected product throughout.

C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

1.5 SUBSTITUTIONS:

A. Substitutions of systems and design details or any other modification proposed by the Contractor will be considered by the Architect only under all of the following conditions:

1. The request shall be made prior to submittal of Shop Drawings or other materials.
2. There is a substantial advantage to the Owner to be realized.
3. Sufficient data, drawings, calculations, and other materials are submitted to facilitate review by the Architect, including proposed cost or time savings.

B. If proposed substitution requires significant review by the Architect, the Contractor shall bear the cost of such review on an hourly basis as follows:

1. Direct Personnel Expense X 2.5.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Deliver, store and handle products in accordance with the manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.

1. Deliver products to the site in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
2. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
3. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION:

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.
2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

B. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:

1. Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

a. Where a specific product is specified as a standard of quality, appearance, performance, or other criteria, the Architect shall have sole authority to determie whether proposed products meet such requirements.

2. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements, and are recommended by the manufacturer for the application indicated. General overall performance of a product is implied where the product is specified for a specific application.

   a. Manufacturer's recommendations may be contained in published product literature, or by the manufacturer's certification of performance.

3. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.
4. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern and texture from the product line selected.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS:

A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.

1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01600

SECTION 01700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Record documents.
3. Operating and maintenance manuals.
4. Submittal of warranties.
5. Final cleaning.

B. Work Specified Elsewhere:

1. Record Foundation plans and Property Surveys are included in Section 01050, "Field Engineering".
2. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-2 through -16.

1.3 SUBSTANTIAL COMPLETION:

A. Definition: "Substantial Completion" is defined in Paragraph 9.8.1 of the General Conditions.

B. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete and submit the following to the Architect. List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

   a. With the Owner's agreement, the Contractor may request Substantial Completion of a portion of the Work. Required procedures shall be repeated for each portion.

2. Prepare and submit to the Architect for review a comprehensive list of items to be completed or corrected.
3. Advise Owner of pending insurance change-over requirements.
4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
5. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
6. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
7. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
8. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.

C. Inspection Procedures: On receipt of a request for inspection, the Architect will review the submitted items and either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Architect will repeat inspection when requested and assured that the Work has been substantially completed.
2. Results of the completed inspection will form the basis of requirements for final acceptance.
3. Failure to include an incomplete item from the list submitted for the Architect's review or from the Architect's inspection does not alter the Contractor's responsibility to complete all work included in the Contract Documents.

1.4 FINAL ACCEPTANCE:

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, including any items subsequently added, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Architect.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
8. Submit record drawings, maintenance manuals, damage or settlement survey, property survey, and similar final record information.
9. Deliver tools, spare parts, extra stock, and similar items.

B. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect.

1. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

C. Multiple Reinspection: After the first reinspection, the cost of additional inspections by the Architect, if required, shall be borne by the Contractor.

1. The Owner may withhold from final payment due reasonable additional compensation paid to the Architect for multiple inspections.

1.5 RECORD DOCUMENT SUBMITTALS:

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of black line white-prints of Contract Drawings and Shop Drawings on site. Neatly and accurately mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
3. Note related clarification sketches, field changes, and Change Order numbers where applicable.
4. Make markings, annotations, and other required indications on record drawing sheets as the work progresses.
5. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Index drawings beginning with Contract Documents in the order listed in the Title Sheet, followed by Shop Drawings in order of Specification Section.
6. Upon completion of the Work, submit one copy of record drawings to the Architect for the Owner's records.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

1. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

1. Upon completion of mark-up, submit bound complete set of record Product Data, properly organized and indexed by Specification Section, to the Architect for the Owner's records.

E. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.

F. Maintenance Manuals: Submit three complete copies. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended "turn around" cycles.
6. Inspection procedures.
7. Shop Drawings and Product Data.
8. Fixture lamping schedule.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES:

A. Operating and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.

4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.2 FINAL CLEANING:

A. General: The work is to be turned over to the Owner in new condition, proper repair, and perfect adjustment.

1. Final cleaning shall be performed before Substantial Completion is claimed. If subsequent operations alter project conditions, repeat cleaning procedures as necessary.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions for methods and cleaning products. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion:

1. Remove labels that are not permanent labels.
2. Remove temporary protective coverings.
3. Clean transparent materials, including mirrors and both faces of glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
4. Clean exposed exterior and interior finishes to a dust-free condition, free of mortar droppings, stains, grease, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum

carpeted surfaces.

5. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
6. Replace filters and clean ducts, fans, and blowers of mechanical equipment if operated during construction period.
7. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

C. Pest Control: Engage an experienced exterminator to make an inspection and provide services as required to rid the Project of rodents, insects and other pests.

D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

1. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01700

SECTION 01900 - EXISTING CONDITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes geotechnical information and soil analysis prepared by GZA GeoEnvironmetal, Inc. and includes the following:

1. Geotechnical investigations performed in June 1991:

    a. A Site Plan showing boring locations and approximate location of soil profile sections (Figure 1).
    b. Three soil profile diagrams (Figures 2-4).
    c. Boring logs of six borings indicated.

2. A Phase I Site Evaluation study performed in Spring 1992.
3. A Site Remediation Cost Estimate prepared in April 1992.

B. The information contained in this Section is furnished as a courtesy by the Owner, which makes no representation as to its accuracy or completeness.

1. The Contractor should not rely on this information in determining groundwater elevations or extent of excavation required.

C. The Contractor is advised of the following:

1. Elevations indicated on soil profiles are based on a different reference elevation than the Site Survey.
2. Site investigation references "Parcel A" and "Parcel B". Parcel A is not included in the contract limit and no work is indicated.
3. Cost estimate information is based on certain assumptions which may be inappropriate for the work indicated.

END OF SECTION 01900

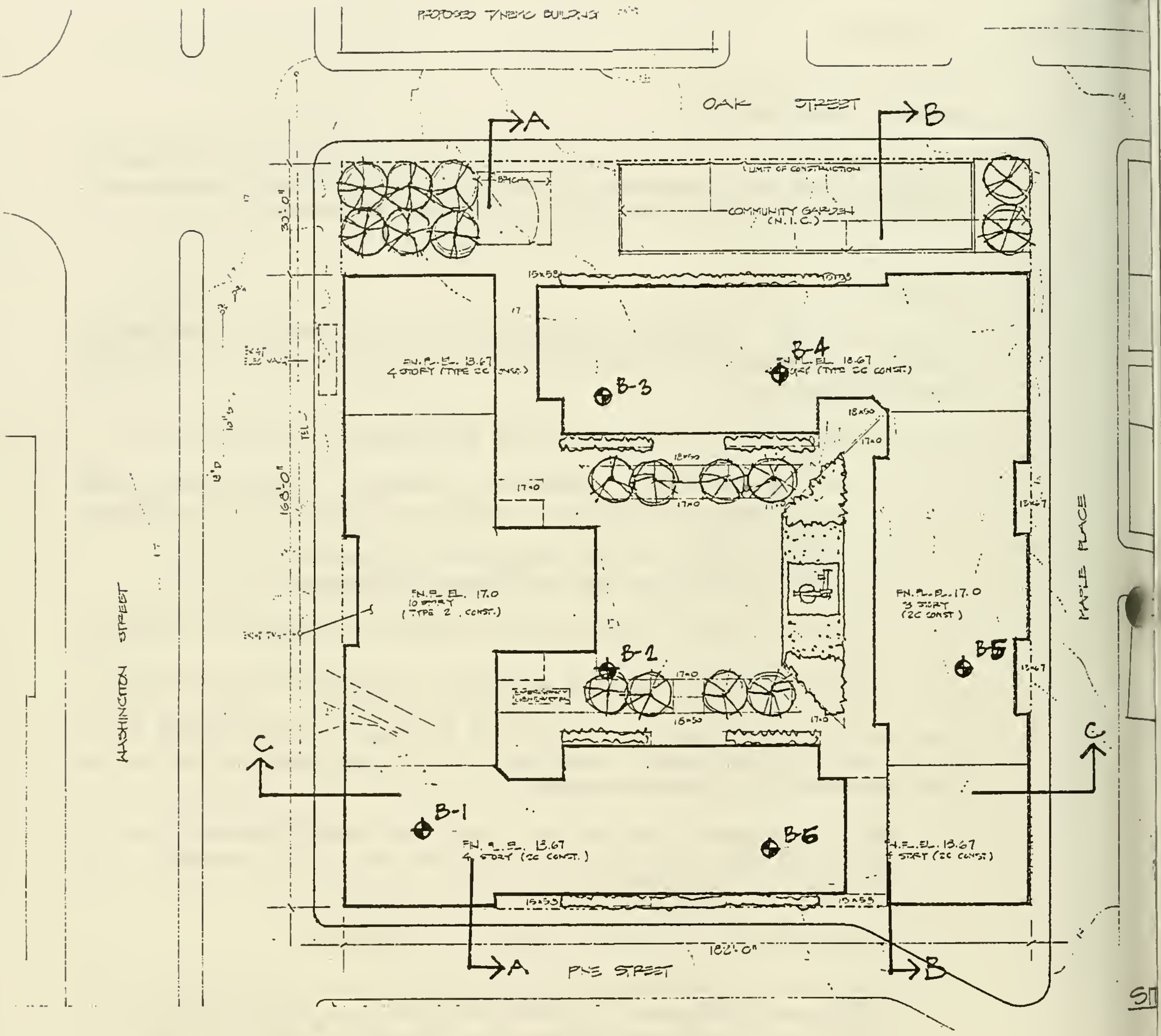


FIGURE 1 - BORING AND SOIL PROFILE LOCATIONS

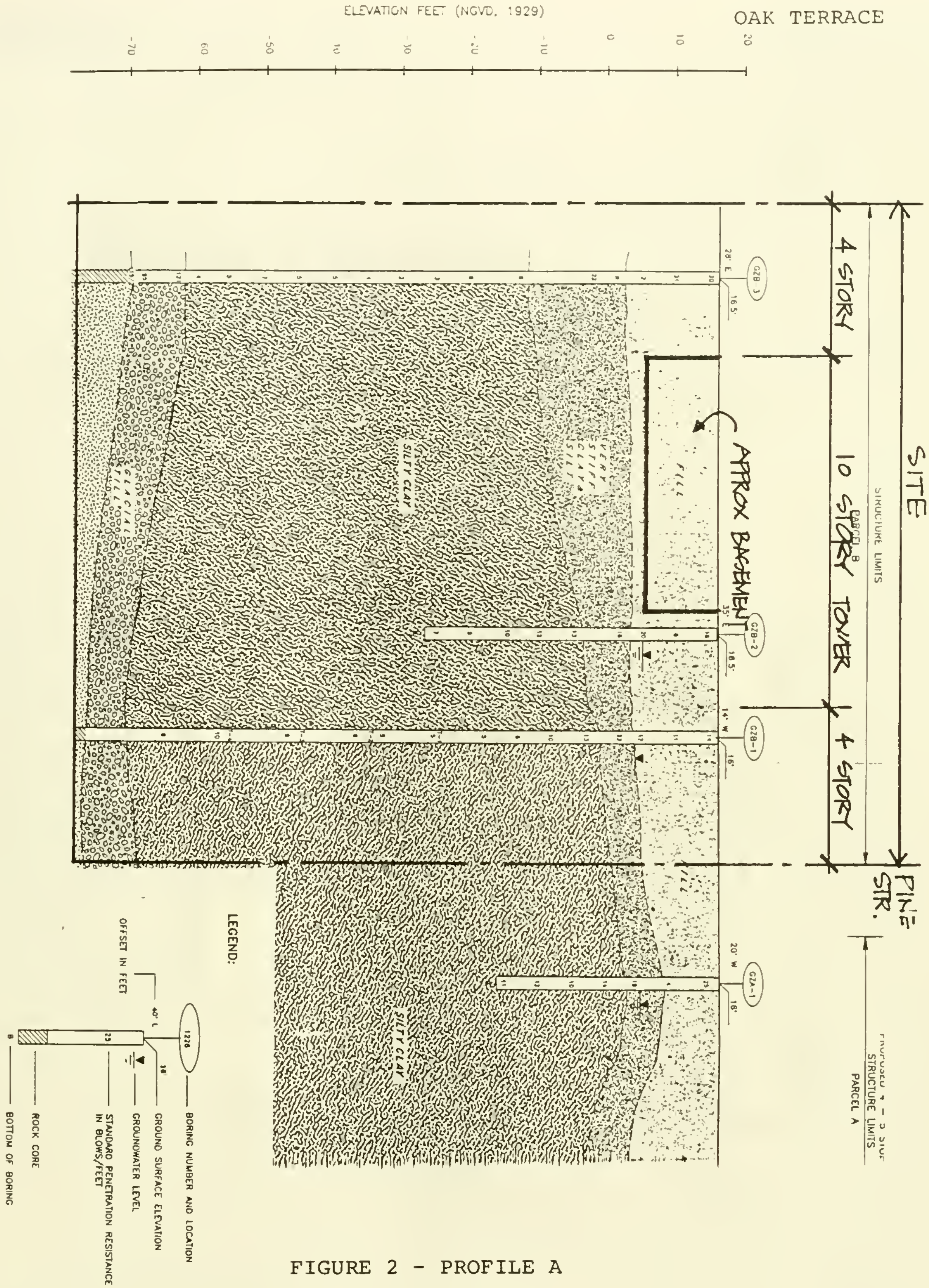


FIGURE 2 - PROFILE A

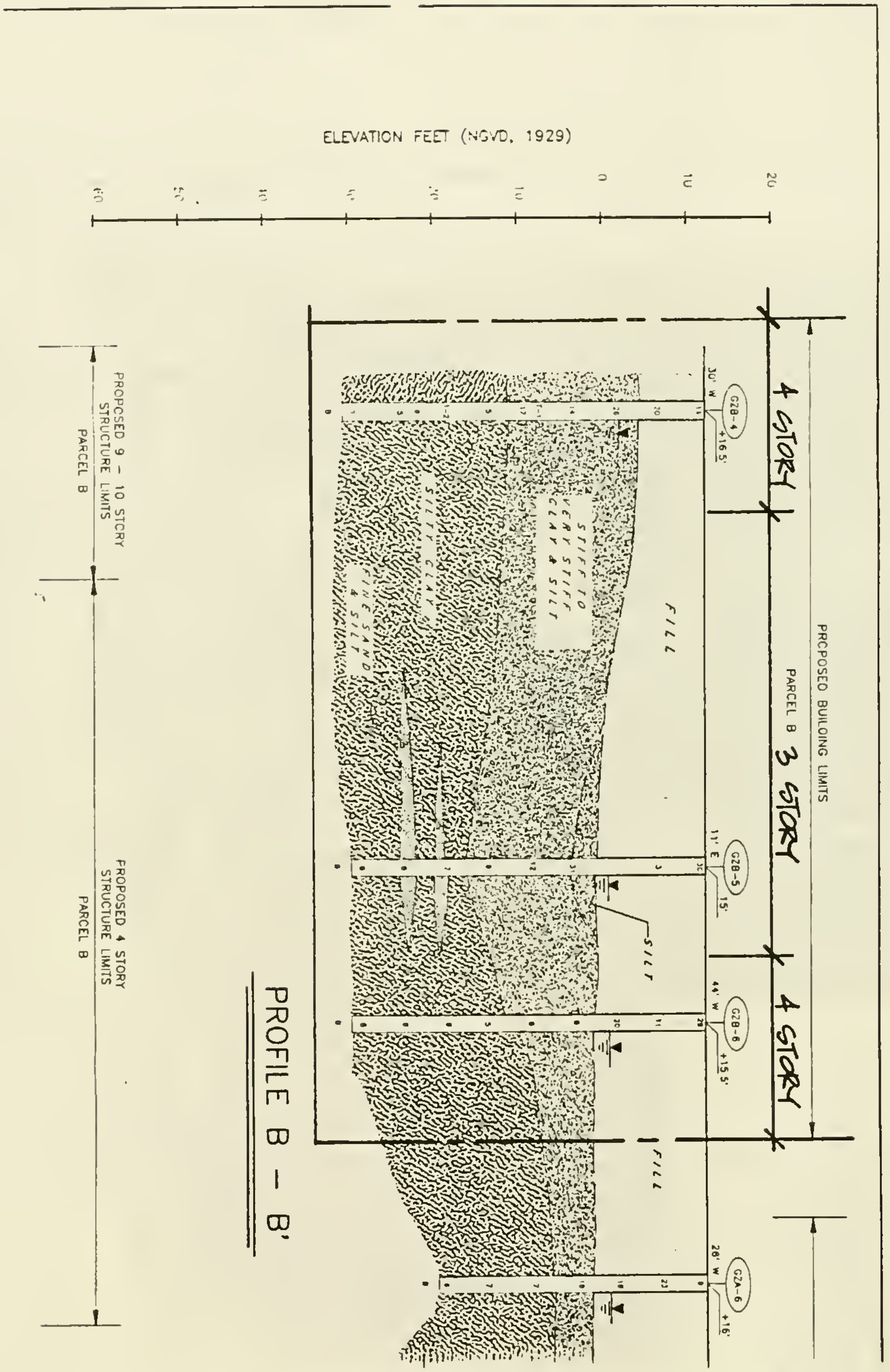


FIGURE 3 - SOIL PROFILE B

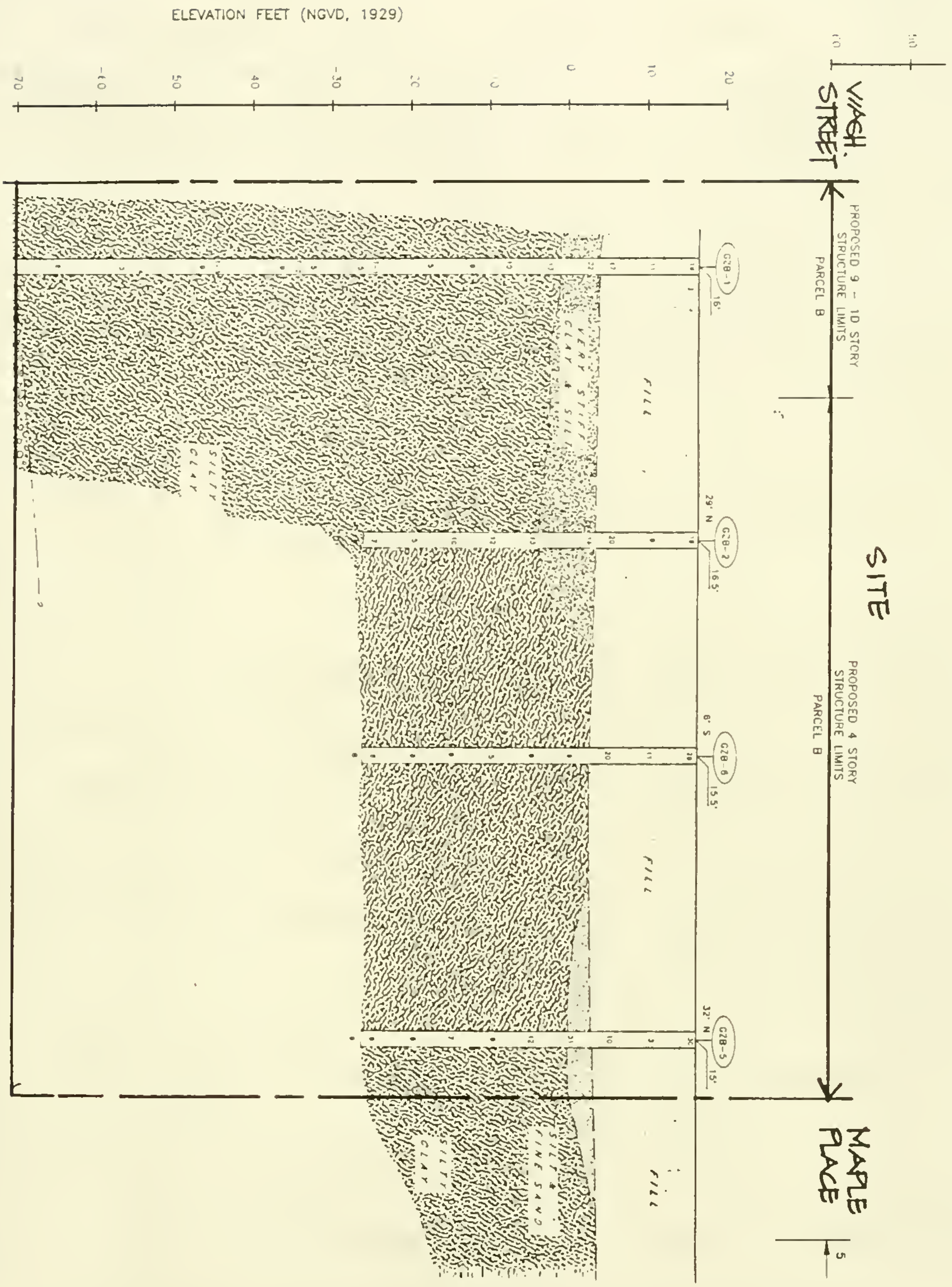


FIGURE 4 - SOIL PROFILE C

GZA GeoEnvironmental, Inc.
Engineers/Scientists

320 Needham Street
Newton Upper Falls, Massachusetts 02164
(617) 969-0050

ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-1
Page 1 of 4
File No. 12535
Chkd. By: FMG

Boring Co.	GZA Drilling, Inc.		
Foreman	C. Linling/P. Brown		
GZA Rep.	M.A. Ponti/ck		
Date Start	6/15/91	End	6/19/91
Location	See Exploration Location Plan		
GS.Elev.		Datum	

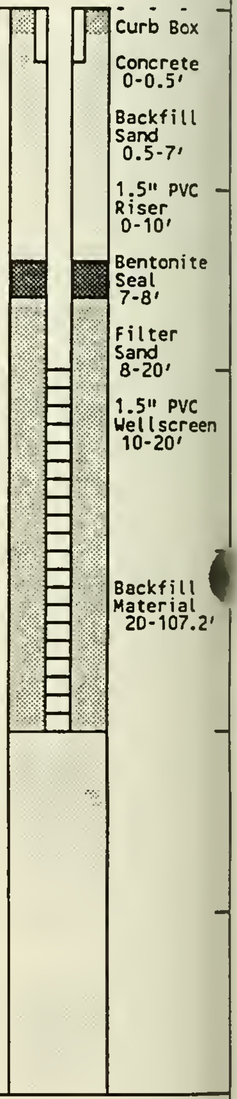
	Casing	Sampler
Type	HW/NW	Split Spoon
I.D./O.D.	4"/3"	2"
Hammer Wt.	300#	140#
Hammer Fall	24"	30"
Other	3-3/4" HSA; 3" Denison Tube; NX Split Barrel	

Groundwater Readings

Date	Time	Depth	Casing	Stab. Time
6/15/91	1300	12'	20'	0 Hrs.

DEPTH	CSNG BLWS	Sample Information No.	Pen./Rec.	Depth (Ft.)	Blows/6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS
		S-1	24/16	0-2	7-5	ND	Medium dense, dark brown, fine to coarse SAND, some(+) Silt, little(+) Gravel (Bricks, FILL).	2" ASPHALT	1. 2.
					9-13				
5		S-2	24/20	5-7	6-6	14.8	Medium dense, dark brown, fine to coarse SAND, some(+) Silt, little(+) Gravel, trace(+) Clay (Bricks, FILL).	GRANULAR FILL	
					5-7				
10		S-3	24/12	10-12	18-9	65	Medium dense, dark brown, fine to coarse SAND, some(+) Silt, little(+) Gravel (Brick, Wood, FILL).		3.
					8-6			± 12.5'	
		S-4	24/16	13-15	10-10	2.2	Very stiff, olive brown, Silty CLAY (moist, highly plastic).	OLIVE BROWN SILTY CLAY	
15					12-14				
								± 17.5'	
		S-5	24/21	18-20	6-7	ND	Stiff, gray, Silty CLAY (moist, highly plastic).		
20					6-6				
								GRAY SILTY CLAY	
		S-6	24/19	23-25	4-5	ND	Stiff, gray, Silty CLAY, (moist, highly plastic).		
25					5-5				
		S-7	24/19	28-30	3-4	ND	Stiff, gray, Silty CLAY, (moist, highly plastic).		
					4-4				

Equipment Installed



Remarks

1. H-Nu readings represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using an H-Nu Model PI-101 photoionization analyzer. Results in parts per million (ppm). ND indicates nothing detected. Testing performed at GZA's Newton laboratory.
2. Locking curb box installed with concrete seal at ground surface.
3. Slight petroleum odor from sample S-3.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

Boring No. GZB-1

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ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-1
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File No. 12535
Chkd. By: FMG

DEPTH	CSNG	BLWS	No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			S-8	24/23	33-35	2-2	ND	Medium stiff, gray, Silty CLAY (moist, highly plastic).	GRAY SILTY CLAY		Backfill Material 20-107.2'
						3-3					
35											
40			T-1	24/24	40-42	300 psi push					
			S-9	24/24	42-44	2-2	ND	Medium stiff, gray Silty CLAY (moist, highly plastic).			
						3-5					
45											
			S-10	24/21	48-50	1-3	ND	Medium stiff, gray, Silty CLAY (moist, highly plastic).			
						2-4					
50			T-2	24/	50-52	300 psi push					
			S-11	24/23	52-54	4-4	ND	Stiff, gray, Silty CLAY (moist, highly plastic).			
						5-6					
55											
60			T-3	24/	60-62	300 psi push					
			S-12	24/24	62-64	3-5	ND	Stiff, gray, Silty CLAY (moist, highly plastic).			
						4-7					

Remarks

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

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ACDC - Parcel B

Chinatown/Boston, Massachusetts

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File No. 12535
Chkd. By: FMG

DEPTH	CSNG	BLWS	No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
70			T-4	24/	70-72	300 psi push					
			S-13	24/12	72-74	3-5	ND	Stiff, gray, Silty CLAY (moist, highly plastic).	GRAY SILTY CLAY		
						5-6					
75											
80			S-14	24/24	80-82	3-3	ND	Medium stiff, gray, Silty CLAY (moist, highly plastic).			Backfill Material 20-107.2'
						5-6					
85									87' ±		
			S-15	24/14	88-90		ND	Wet, very dense, gray, fine to coarse SAND, little(+) Gravel, little(+) Silt.	GLACIAL TILL		
90											
									94.5' ±	4.	
95						min/ft					
			C-1	60/42	97.3-102.3		RQD=70	Hard, freshly weathered, slightly fractured dark gray, ARGILLITE; close-moderately close drilling breaks along moderately dipping bedding planes; occasional calcite fillings parallel-perpendicular to bedding planes.	ARGILLITE BEDROCK	5.	
						3.5					
						4					
						4.2					

Remarks

4. Roller bit through rock between 94.5 and 97.3 feet.
5. NX split barrel sampler used to core rock; for rock coring, the number in the blows/6" column is minutes per foot of coring.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

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Chkd. By: FMG

DEPTH	CSNG	BLWS	Sample Information No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
						4.0					
						5.0			ARGILLITE BEDROCK		
			C-2	60/57	102.3-107.3	4.3	RQD=95	Hard, freshly weathered, slightly fractured dark gray, ARGILLITE; close-moderately close drilling breaks along moderately dipping bedding planes; occasional calcite fillings parallel-perpendicular to bedding planes.			Backfill Material 20-107.2'
						3.5					
						3.7					
105						3					
						3.3					
								Bottom of Boring at 107.2 Feet.			
110											
115											
120											
125											
130											

Remarks

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

Boring No. GZB-1

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ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-2
Page 1 of 2
File No. 12535
Chkd. By: FMG

Boring Co.	GZA Drilling, Inc.		
Foreman	C. Linling/Peter Brown		
GZA Rep.	M.A. Ponti/ck		
Date Start	6/13/91	End	6/13/91
Location	See Exploration Location Plan		
GS.Elev.		Datum	

	Casing	Sampler
Type	HW/NW	Split Spoon
I.D./O.D.	4"/3"	2"
Hammer Wt.	300#	140#
Hammer Fall	24"	30"
Other	3-3/4" HSA	

Groundwater Readings

Date	Time	Depth	Casing	Stab. Ti
6/13/91	1201	10.8'	20	0 Hrs.

DPTH	CSNG	BLWS	Sample Information No.	Pen./Rec.	Depth (Ft.)	Blows/6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			S-1	24/17	0-2	5-13	1.0	Medium dense, black, fine to coarse SAND, some(+) Gravel, some(-) Silt (Brick, Glass, FILL).			NO EQUIPMENT INSTALLED
						6-12					
									GRANULAR FILL		
5			S-2	24/19	5-7	8.3	ND	Medium stiff, olive brown, SILT and CLAY (moist, FILL).			
						3-4					
10			S-3	24/20	10-12	5-8	0.8	Medium dense, olive gray, fine to coarse SAND and Clayey SILT (moist FILL).	11' ±		Backfill Material 0-42'
			S-3A			12-6	ND	3A: Olive brown, Silty CLAY (moist, highly plastic).			
			S-4	24/23	13-15	6-8	ND	Very stiff, Olive brown, Silty CLAY (moist, highly plastic).	OLIVE BROWN SILTY CLAY		
						8-8					
15											
									± 17.5'		
20			S-5	24/24	20-22	5-6	ND	Stiff, gray, Silty CLAY (moist, very highly plastic).			
						7-7			GRAY SILTY CLAY		
25			S-6	24/24	25-27	4-5	ND	Stiff, gray, Silty CLAY (moist, very highly plastic).			
						7-7					

Remarks

1. See Remark No. 1 on Boring Log No. GZB-1.
2. See Remark No. 2 on Boring Log No. GZB-1.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

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Chkd. By: FMG

DEPTH	CSNG	BLWS	No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			S-7	24/24	30-32	4-5	ND	Stiff, gray, Silty CLAY (moist, highly plastic).			
						5-4					
35			S-8	24/24	35-37	2-3	ND	Medium stiff, gray, Silty CLAY (moist, very highly plastic).	GRAY SILTY CLAY		Backfill Material 0-42'
						2-2					
40			S-9	24/24	40-42	3-4	ND	Medium, stiff, gray, Silty CLAY (highly plastic).			
						3-3					
								Bottom of Boring at 42 Feet.			
45											
50											
55											
60											

Remarks

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

Boring No. GZB-2

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ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-3
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File No. 12535
Chkd. By: FMG

			Casing	Sampler
Boring Co.	GZA Drilling, Inc.			
Foreman	C. Linling	Type	HW/NW	Split Spoon
GZA Rep.	C. Marshall/ck	I.D./O.D.	4"/3"	1-3/8"
Date Start	6/07/91 End 6/13/91	Hammer Wt.	300#	140#
Location	See Exploration Location Plan	Hammer Fall	24"	30"
GS.Elev.	Datum	Other	3-3/4 HSA	NX Split Barrel

Groundwater Readings

Date	Time	Depth	Casing	Stab. Time
6/7/91	1300	NA	10	0

DEPTH	CSNG BLWS	Sample No.	Pen./Rec.	Depth (Ft.)	Blows/6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
		S-1	24/14	0-2	9-11 9-12	2.2	Medium dense, black, fine to coarse SAND, some(-) Silt (brick, FILL).		1. 2.	NO EQUIPMENT INSTALLED
5		S-2	24/17	5-7	10-17 14-12	6.8	Dense, brown-black, fine to coarse SAND, some(-) Silt, little(-) Gravel.	GRANULAR FILL		
10		S-3	24/3	10-12	1-1 1-2	0.5	Moist, very loose, olive-brown, fine to coarse SAND, some(+) Silt and Clay.		3.	Backfill Material 0-100'
								± 13.5'	4.	
15		S-4	0/0	15-17	100/0"		No Recovery.			
		S-5	24/20	17-19	11-12 10-9	ND	Very stiff, olive-brown, CLAY, little(-) Silt (plastic). Pp = 1.7 tsf, Tv = 0.8 tsf	OLIVE BROWN SILTY CLAY		
20										
		S-6	0/0	21-23	30/0		Pulled HSA and dropped 4" HW casing to 20.5'. No Sample Recovery.	23' ±	5.	
25								GRAY SILTY CLAY		
		S-7	24/24	28.5-30.5	2-3 5-5	ND	Medium stiff, gray, Silty CLAY (moist, highly plastic).			

Remarks

1. See Remark No. 1 on Boring Log No. GZB-1.
2. See Remark No. 2 on Boring Log No. GZB-1.
3. Groundwater encountered at approximately 11 feet.
4. Encountered obstruction at 14'; refusal at 15'; augers through obstruction at 18.5'.
5. Encountered obstruction at 19.5'-21.8'; and 25'-26.5'.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

Boring No. GZB-3

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ACDC - Parcel B

Chinatown/Boston, Massachusetts

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Chkd. By: FMG

DEPTH	CSNG	BLWS	Sample Information No.	Pen./Rec.	Depth (Ft.)	Blows/6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			S-7	24/24	28.5-30.5	5-5	ND	Stiff, gray, Silty CLAY (very highly plastic).			NO EQUIPMENT INSTALLED
35			S-8	24/24	35-37	2-2	0.2	Medium stiff, gray, Silty CLAY (moist very highly plastic).	GRAY SILTY CLAY		
						4-4					
40			S-9	24/24	40-42	1-1	ND	Soft, gray, Silty CLAY (moist, very highly plastic).			Backfill Material 0-100'
			S-9A			2-2		S-9A: Soft, gray, Silty CLAY, trace(+) fine Sand and Silt partings.			
									43.5' ±		
									GRAY SILT AND CLAY		
45			S-10	24/24	45-47	1-1	ND	Very soft, SILT and CLAY (moist, low plasticity).			
			S-10A			1-2					
									48.5' ±		
50			S-11	24/24	50-52	2-1	ND	Soft, gray, Silty CLAY (very highly plastic).			
						3-3			GRAY SILTY CLAY		
55			S-12	24/24	55-57	2-3	ND	Medium stiff, gray, Silty CLAY (very highly plastic).			
						2-2					
60			S-13	24/24	60-62	2-2	ND	Medium stiff, gray, Silty CLAY (very highly plastic).			
						3-4					

Remarks

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Boring No. GZB-3

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Chkd. By: FMG

DEPTH	CSNG	BLWS	No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			S-14	24/24	65-67	2-3	ND	Medium stiff, gray, Silty CLAY (very highly plastic).			NO EQUIPMENT INSTALLED
						4-4					
70			S-15	24/24	70-72	1-3	ND	Medium stiff, gray, Silty CLAY (very highly plastic).	GRAY SILTY CLAY		
						2-4					
75			S-16	24/18	75-77	2-2	ND	Soft, gray, Silty CLAY (very highly plastic).			Backfill Material 0-100'
						2-2					
									± 78'		
			S-17	24/4	78-80	43-61	ND	Very dense, gray GRAVEL and fine to coarse SAND, trace(+) Silt.		6.	
80						60-74					
									GLACIAL TILL		
85			S-18	24/0	83-85	115-59	ND	No Recovery.			
						36-34					
			S-19	19/4	85-86.5	37-46	1.4	Very dense, gray GRAVEL, some Silt and fractured Rock, little fine to coarse Sand (Sand mostly wash from S-18). Dropped 3" NW CASING to 90'.	± 86.6'		
						58-115/2"					
						min/ft					
90			C-1	60/ 59.5	90-95	3	RQD=99	Hard, freshly weathered, slightly fractured sound, dark gray ARGILLITE; close to moderately close drilling breaks parallel-perpendicular to bedding planes; occasional calcite fillings parallel-perpendicular to bedding planes.	ARGILLITE BEDROCK	7.	
						3.5					
						4					
						3.5					
						3.2					
95			C-2	60/60	95-100	3 min.		Hard, freshly weathered, slightly fractured sound, dark gray ARGILLITE; close to moderately close drilling breaks parallel-perpendicular to bedding planes; occasional calcite fillings parallel-perpendicular to bedding planes.			
						3.1					
						3.2					
						3.5					
						4.1					

Bottom of Boring at 100 Feet.

Remarks

6. Driller noted gravel in wash and increased resistance to drill bit at 78 feet.
7. Roller bit through rock between 86.6 and 90 feet.
8. For coring, the number in the blows/6" column is minutes per foot of coring.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

Boring No. GZB-3

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ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-4
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File No. 12535
Chkd. By: FMG

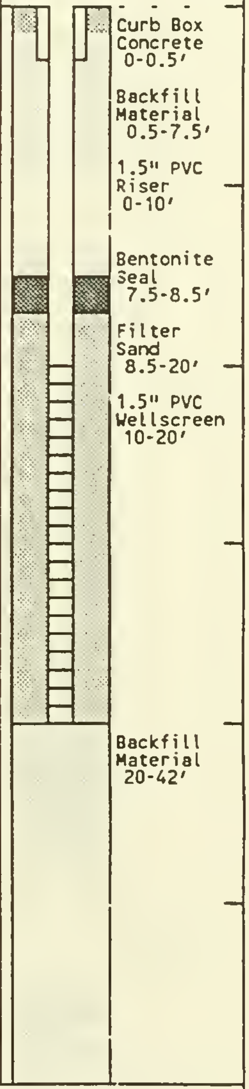
Boring Co.	GZA Drilling, Inc.		Casing	Sampler
Foreman	C. Linling/P. Brown	Type	HW/NW	Split Spoon
GZA Rep.	M.A. Ponti/ck	I.D./O.D.	4"/3"	2"
Date Start	6/14/91 End 6/14/91	Hammer Wt.	300#	140#
Location	See Exploration Location Plan	Hammer Fall	24"	30"
GS.Elev.	Datum	Other	3-3/4" HSA; 3" Denison Tube	

Groundwater Readings

Date	Time	Depth	Casing	Stab. Time
6/14/91	1300	11'	20'	0 Hrs.
6/19/91	0900	10'	Out	5 Days ±

DEPTH	CSNG BLWS	No.	Pen./Rec.	Depth (Ft.)	Blows/6"	HN-u Test Data	Sample Description & Classification	Stratum Description	RMKS
		S-1	24/24	0-2	8-6	ND	Medium dense, dark brown, fine to coarse SAND, some(+) Silt, little(+) Gravel (brick, FILL).	Cobblestones	
					5-5			FILL	
5		S-2	24/18	5-7	7-11	ND	Very stiff, olive brown, CLAY and SILT, and fine to coarse SAND, some(+) Silt, little(+) Gravel (brick, FILL).		
					9-10				
								± 8.5'	
10		S-3	24/	10-12	9-12	ND	Very stiff, olive brown, CLAY and SILT.	CLAY AND SILT	
					14-11				
15		S-4	24/24	15-17	4-6	ND	Very stiff, olive brown, CLAY and SILT, trace(-) fine Sand layers.		
					8-15				
								± 18.5'	
20		T-1	12/12	20-21	Push 300 psi			OLIVE BROWN SILTY CLAY	
		S-5	24/24	21-23	7-9	1.7	Very stiff, olive brown, Silty CLAY (moist, highly plastic).		
					8-7				
								± 24'	
25		S-6	24/24	25-27	2-2	ND	Medium stiff, gray, Silty CLAY.	GRAY SILTY CLAY	
					3-4				

Equipment Installed



Remarks

1. See Remark No. 1 on Boring Log GZB-1.
2. See Remark No. 2 on Boring Log GZB-1.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

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DEPTH	CSNG	BLWS	Sample Information No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			T-2	24/24	30-32	300 psi push					Backfil Material 20-42'
			S-7	24/24	32-34	4-3	ND	Medium stiff, soft, gray Silty CLAY (moist, highly plastic).			
						3-4			GRAY SILTY CLAY		
35			S-8	24/24	35-37	2-3	ND	Medium stiff, soft, gray Silty CLAY (moist, highly plastic).			
						2-2					
40			S-9	24/24	40-42	2-3	ND	Medium stiff, soft, gray Silty CLAY (moist, highly plastic).			
						4-4					
								Bottom of Boring at 42 Feet.			
45											
50											
55											
60											

Remarks

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Boring No. GZB-4

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ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-5
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File No. 12535
Chkd. By: FMG

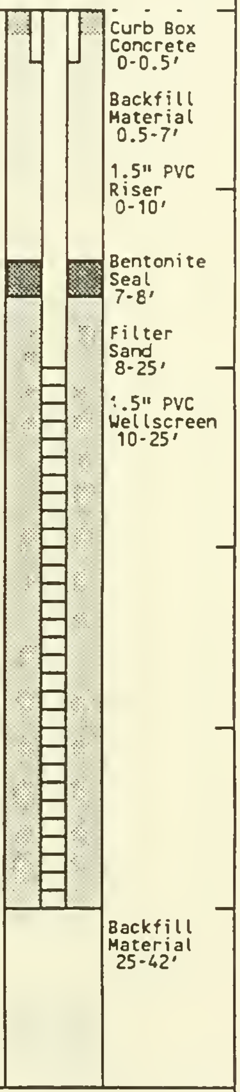
Boring Co. GZA Drilling, Inc.		Casing	Sampler
Foreman George S./Charles L.	Type		Split Spoon
GZA Rep. M.A. Ponti/ck	I.D./O.D.		2"
Date Start 6/05/91 End 6/06/91	Hammer Wt.		140#
Location See Exploration Location Plan	Hammer Fall		30"
GS.Elev. Datum	Other 3-3/4" HSA		

Groundwater Readings

Date	Time	Depth	Casing	Stab. Time
6/5/91	1400	none	15.5	0 Hrs.
6/7/91	0730	11.75	-	17 ± Hrs.
6/8/91	0630	10.78	-	1.8 days ±
6/19/91	0700			

DEPTH	CSNG	BLWS	Sample Information No.	Pen./Rec.	Depth (Ft.)	Blows/6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS
			S-1	24/14	0-2	6-14	ND	Dense, gray, fine to coarse SAND, some(+) Gravel, some(-) Silt (brick, FILL).		1. 2.
						16-21				
5			S-2	24/18	5-7	3-2	0.5	Very loose, gray, fine to coarse SAND and Clayey Silt (moist, FILL).	GRANULAR FILL	
						1-3				
										3.
10			S-3	24/11	9.5-11.5	11-3	1.2	Loose, gray, fine to coarse SAND, some(+) Clayey Silt (wet, FILL).		
						7-10				
									± 13.5'	
									SILT	
15			S-4	24/24	15.5-17.5	10-17	ND	Moist, dense, light brown, SILT, some(-) fine Sand.	± 16'	
			S-4A			14-12	ND	S-4A: Moist, light brown, Silty CLAY.		
									CLAY AND SILT	
20			S-5	24/24	20-22	5-6	30	Stiff, olive brown, CLAY and SILT (moist, medium plastic).		
			S-5A			6-7	1.2			
									± 23.5'	
25			S-6	24/24	25-27	3-4	27	Stiff, gray, Silty CLAY, trace(+) fine Sand and Silt lenses (1-2" thick, moist, highly plastic).	GRAY SILTY CLAY	
			S-6A			5-6	ND			

Equipment Installed



Remarks

1. See Remark No. 1 on Boring Log GZB-1.
2. Locking curb box installed with concrete at ground surface.
3. Obstruction encountered between ± 8 and ± 9.5 feet below existing grade.
4. Approximately 5 to 6 inches of fine sand and silt layers were encountered in split spoon samples S-7A and S-8.
5. Strong petroleum odor similar to gasoline encountered while adding filter sand; odor stopped after filter sand added to 8 feet below grade.

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Boring No. GZB-5
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File No. 12535
Chkd. By: FMG

DEPTH	CSNG	BLWS	No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			S-7	24/24	30-32	1-3	0.8	Medium stiff, loose, gray, Silty CLAY (moist, highly plastic).	F.SAND&SILT	4.	Backfill Material 25-42'
			S-7A/S-7B			4-5	0.2/ND	S-7A: Gray, fine SAND and SILT (moist, highly plastic). S-7B: Gray, Silty CLAY (moist, highly plastic).	GRAY SILTY CLAY ± 33.5'		
									FINE SAND & SILT ± 35.5'		
35			S-8	24/24	35-37	3-4	ND	Loose, gray, fine SAND and SILT, trace(+) Clay (moist).		4.	
			S-8A			4-5	ND	S-8A: Medium stiff, gray, Silty CLAY, (moist, highly plastic).	GRAY SILTY CLAY		
40			S-9	24/24	40-42	3-4	ND	Stiff, gray, Silty CLAY (moist, highly plastic).			
						5-5				5.	
								Bottom of Boring at ± 42 Feet.			
45											
50											
55											
60											

Remarks

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

Boring No. GZB-5

GZA GeoEnvironmental, Inc.
Engineers/Scientists

320 Needham Street
Newton Upper Falls, Massachusetts 02164
(617) 969-0050

ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-6
Page 1 of 2
File No. 12535
Chkd. By: FMG

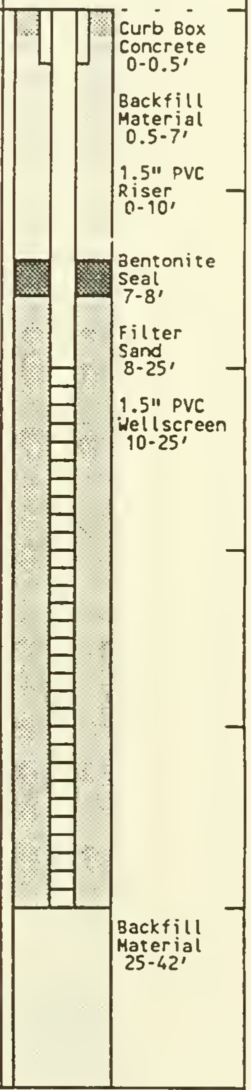
Boring Co.	GZA Drilling, Inc.		Casing	Sampler
Foreman	C. Linling	Type	HW/NW	Split Spoon
GZA Rep.	M.A. Ponti/ck	I.D./O.D.	4"/3"	2"
Date Start	6/08/91 End 6/08/91	Hammer Wt.	300#	140#
Location	See Exploration Location Plan	Hammer Fall	24"	30"
GS.Elev.	Datum	Other	3-3/4" HSA	

Groundwater Readings

Date	Time	Depth	Casing	Stab. Time
6/8/91	1150	10.75	25'	0 Hrs.
6/10/91	0610	10.64	Out	± 1.8 days
6/21/91	0800	10.79	Out	± 11 days

DEPTH	CSNG	BLWS	No.	Pen./Rec.	Depth (Ft.)	Blows/6"	HNu Test Data	Sample Description & Classification	Stratum Description	RMKS
			S-1	24/14	0-2	11-12 17-14	ND	Medium dense, black, fine to coarse SAND, some(+) Gravel, some(-) Silt (brick, FILL).	GRANULAR FILL	
5			S-2	24/19	5-7	3-4	ND	Medium dense, black, fine to coarse SAND, some(+) Gravel, some(-) Silt (concrete, brick, FILL).		
			S-2A			7-7	ND	S-2A: Olive brown, SILT and CLAY.		
10			S-3	24/18	10-12	7-9	22	Medium dense, black, fine to coarse SAND, some(+) Silt (brick, FILL).		
			S-3A			11-15	1.2	S-3A: Olive brown, SILT and CLAY (FILL).	± 13.5'	
15			S-4	24/24	15-17	3-4	0.3	Stiff, olive brown, SILT and CLAY (moist).	OLIVE BROWN SILT AND CLAY	
			S-4A			4-5		S-4A: Olive brown, SILT and CLAY with trace 1/16" tan, fine SAND and SILT laminae (moist).	± 18.5'	3.
20			S-5	24/24	20-22	3-4 4-5	ND	Stiff, gray, Silty CLAY (moist, highly plastic).	GRAY SILTY CLAY	
25			S-6	24/24	25-27	1-2	0.6	Medium stiff, gray, Silty CLAY, trace(-) Silt laminae (moist).		
			S-6A			3-4	0.2	S-6A: Gray, Silty CLAY.		

Equipment Installed



Remarks

1. See Remark No. 1 on Boring Log GZB-1.
2. Locking curb box with concrete installed at ground surface.
3. Occasional 1/16" laminae of fine Sand/Silt.
4. Sample appeared to expand inside sample jar.

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

GZA GEOENVIRONMENTAL, INC.
Engineers/Scientists

320 Needham Street
Newton Upper Falls, Massachusetts 02164
(617) 969-0050

ACDC - Parcel B

Chinatown/Boston, Massachusetts

Boring No. GZB-6
Page 2 of 2
File No. 12535
Chkd. By: FMG

DEPTH	CSNG	BLWS	Sample Information					Sample Description & Classification	Stratum Description	RMKS	Equipment Installed
			No.	Pen./ Rec.	Depth (Ft.)	Blows/ 6"	HNu Test Data				
			S-7	24/24	30-32	2-3	0.2	Medium stiff, gray, Silty CLAY (moist, highly plastic).			
						3-4					
35			S-8	24/24	35-37	2-3	ND	Medium stiff, Silty CLAY, trace(-) Silt laminae (moist, highly plastic).	GRAY SILTY CLAY	3. 4.	Backfill Material 25-42'
						5-4					
40			S-9	24/24	40-42	4-3	ND	Medium stiff, gray, Silty CLAY, trace(-) Silt laminae (moist, highly plastic).		4.	
						5-4					
								Bottom of Boring at ± 42 Feet.			
45											
50											
55											
60											

Remarks

Stratification lines represent approximate boundaries between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to factors other than those present at the time measurements were made.

Boring No. GZB-6

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

GZA

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Newton Upper Falls
Massachusetts 02164
617-969-0050
FAX 617-965-7769

April 10, 1992
File No. 12854-C

Ms. Carol Lee
ACDC and CEDC
360-B Tremont Street
Boston, Massachusetts 02116

Re: Phase I - Site Evaluation
BRA Parcels A and B
Washington Street
Boston, Massachusetts

Dear Ms. Lee:

In accordance with our proposal dated February 10, 1992, and subsequent authorizations, GZA GeoEnvironmental, Inc. (GZA) has conducted a Phase I - Limited Site Investigation of the BRA Parcels A and B on Washington Street in Boston, Massachusetts. This Report has been prepared in accordance with the Limitations and Terms and Conditions set forth in Appendix A.

This Report describes the conditions observed by GZA at the study site. The text presents the results of the site reconnaissance, site history research, regulatory agency file review, subsurface exploration program, and chemical screening and analyses of soil and water from the site. Conclusions of our study are provided in Section 9.00.

It is our opinion that the sites should be classified as "non-priority" disposal sites and that they are eligible for waivers of Massachusetts Department of Environmental Protection (DEP) approvals for further investigation/remediation. Based on these findings we have also completed Preliminary Assessment Reports, Interim Site Classification Forms and Waiver Applications for the two sites. These are provided separately.

We have appreciated the opportunity to work with you on this project.

Very truly yours,

A Subsidiary of GZA
GeoEnvironmental
Technologies, Inc.

GZA GEOENVIRONMENTAL, INC.

James R. Bossange
Project Manager

Charles A. Lindberg

Charles A. Lindberg
Associate Principal

Sara R Hanna

Sara R. Hanna
Consultant/Reviewer

JRB/CAL:lr
Attachment: Report

cc: Matthew Garrison, Esq. - 1 copy

An Equal Opportunity Employer M/F/V/H

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1.00 INTRODUCTION

In accordance with our proposal dated February 10, 1992, GZA GeoEnvironmental, Inc. (GZA) has completed a Phase I - Limited Site Investigation of the BRA Parcels A and B site on Washington Street in Boston, Massachusetts. Our study was completed on behalf of the Asian Community Development Corporation (ACDC) and the Chinese Economic Development Corporation (CEDC).

According to the Massachusetts Contingency Plan (MCP), 310 CMR 40.000, the purpose of the Phase I - Limited Site Investigation is to confirm whether or not the location is a disposal site and, if the site is a disposal site, to provide information necessary for the Massachusetts Department of Environmental Protection (DEP) to classify the site pursuant to 310 CMR 40.544. A Phase I - Limited Site Investigation is not intended to be a comprehensive investigation, but rather an initial study that provides the DEP with the necessary information to classify the site under the provisions of the MCP.

The scope of services included: a site visit; a review of site history; contact with certain local and state officials, and review of certain state and federal files and lists regarding possible environmental concerns at or near the subject site; subsurface explorations in the form of test borings and groundwater monitoring well installations; sampling of soil and the groundwater monitoring wells; limited screening/analysis of the soil and groundwater samples at GZA's Newton Environmental Chemistry Laboratory (ECL) and Matrix Analytical, Inc. of Hopkinton, Massachusetts; and the preparation of this Phase I report.

2.00 BACKGROUND

The following paragraphs describe the physical layout of the site, its hydrogeologic setting and utilities on the site.

2.10 SITE LOCATION

The site is located near the Chinatown section of Boston just to the north of the Massachusetts Turnpike. A site locus is provided as Figure 1, and a site plan is presented on Figure 2. Parcels A and B are both on the east side of Washington Street, and Pine Street extends diagonally to the southeast from Washington Street across both Parcels A and B. Parcel A consists of two lots: Lot R3A2 is approximately 32,745 square feet, and lot R3A1 is approximately 3,594 square feet. Lot R3A1 and a small portion of lot R3A2 are north of Pine Street, and the larger portion of lot R3A2 is south of Pine Street. Most of Parcel B, which consists of one lot (lot R3B), is north of Pine Street; however, the southwest corner of Parcel B is to the south of Pine Street.

The site is in a mixed residential and commercial neighborhood. Oak Street, beyond which is a parking lot, is to the north of the site, and Washington Street, beyond which is the Josiah Quincy Elementary School, is to the west of the site. Marginal Street, beyond which is a below grade portion of the Massachusetts Turnpike, is to the south of the site. Residences and the Chinese Evangelical Church are to the east of the site. Maple Place abuts the northern portion of the site, and a 28-foot-wide section of property that is labeled as "public" separates a small portion of the study site (lot R3A1) from the main portion of the site (lots R3A2 and R3B). The Tufts/New England Medical Center is approximately 100 feet to the northwest of Parcel B.

Site latitude and longitude coordinates are 42° 20' 48" north and 72° 3' 49" west, respectively. Site Universal Transverse Mercator (UTM) coordinates are 4,690,350 meters north and 329,775 meters east.

2.20 TOPOGRAPHY AND DRAINAGE

According to the U.S. Geological Survey topographic quadrangle map of the area (Boston South Quadrangle, 1979), the site is located approximately 1/2 mile west of Fort Point Channel. Based on a preliminary review of the area's topography and location, and data collected during a groundwater elevation survey, groundwater flow is to the southeast. However, localized flow directions in the vicinity of the site may vary as a result of underground utilities (e.g., storm drains, sewers, utility conduits) or heterogeneous subsurface conditions.

Subsequent references to upgradient or downgradient directions in relation to the site are relative to GZA's anticipated southeasterly direction of groundwater flow.

2.30 SITE DESCRIPTION

Site reconnaissances were performed on Parcels A and B on two dates: June 25, 1991 and February 18, 1992. Photographs of the site are included with the Figures section of this report.

Parcel B is covered by a building, a playground, landscaped land and a former vegetable garden. An abandoned six-story masonry building is along Washington Street. Its interior was observed by GZA geologist Richard Ponti on June 25, 1991; however, the building interior was not observed during our February 18, 1992 site reconnaissance since the building appeared to have fallen into further disrepair. Most of the building windows were broken or boarded up.

Our June 25, 1991 site reconnaissance indicated that each of the floors contained one staircase and elevator shaft in the central area of the building and one staircase at the rear of the building. Sinks, showers and bathrooms are located on the rear corners of the structure on each floor.

The first floor contained trash, desks, broken video games, a few empty spray paint cans, some automotive paints and one empty 55-gallon drum labeled as a degreaser. The south portion of the building appeared to have been an automotive bay or garage at one time (see Photograph No. 2). Small isolated surficial oil and grease stains were observed on the concrete floor. No floor drains were observed. The southeast corner of the building contained one, approximately 275-gallon aboveground fuel storage tank. GZA could not determine if the tank was still storing a liquid. A 3-foot by 4-foot surficial stain was observed on the concrete floor near the tank. The rest of the floors were wood and contained broken glass, wood debris, broken furniture, printing presses, bench lathes, empty 1-gallon and 5-gallon paint cans, clothing, children's books, toys, records, ceiling tiles and a few mattresses. Each of the sinks and bathrooms were observed, and no evidence of oil or hazardous materials were noted. The sixth floor bathroom pipes appeared to have white fibrous insulation, possibly asbestos, around the pipes.

The basement contained a large boiler and a cinder block containment vault at the southeast corner. GZA did not have access to observe the inside of the vault at the time of the visit. The basement also contained large quantities of wood debris, glass, and broken furniture. Two 4- to 6-inch-diameter pipes adjacent to the ceiling also appeared to contain white fibrous insulation that could be asbestos (It is noted that an asbestos survey of the building was not part of our current scope of work). No evidence of a release of oil or hazardous materials was observed in the building except for the minor floor staining. In addition, white fibrous insulation, possibly asbestos, may be present around a few of the pipes in the basement and the sixth floor.

A small communal garden is on the north portion of the study site, while a landscaped area is on the east portion of the study site. A playground is on the eastern portion of the site, and includes a paved basketball court and various recreational apparatus such as a swing set. GZA did not observe stressed vegetation or significant surficial staining in the landscaped land or playground areas.

Automobile parking areas are on the southern portion of the site. An unpaved gravel parking area, surrounded by a chain link fence, is located south of the playground area on the eastern portion of the site on Parcels A and B. A portion of a paved parking lot is to the south of Pine Street on the southwest portion of Parcel B and most of Parcel A. According to the parking attendant at the paved parking area south of

Pine Street, the unpaved lot is used by employees of the Josiah Quincy School, and the paved parking area is operated by New England Medical Center. Parcel A was occupied by automobiles on paved and unpaved parking areas during the site visits. The portion of Parcel A that is to the south of Pine Street was a paved parking lot, and the portions of Parcel A north of Pine Street were part of an unpaved parking lot. Oil-like stains typically associated with automobile parking areas were observed on the parking lots. A small guard shack was on the paved parking lot to the south of Pine Street on Parcel A. Three catch basins believed to be connected to the a storm drain beneath Pine Street were observed near the east side of the paved parking area to the south of Pine Street.

2.40 SITE UTILITIES

Several utilities are on the site; refer to the utility plan that is attached as Figure 4 for approximate locations of these lines. Underground utilities (water, natural gas, sewer and electric) are located under Pine Street. Abandoned underground telephone lines and water lines enter onto the southwest section of Parcel A's paved lot from Washington Street. The abandoned telephone lines end in the southeast section of Parcel A's main lot, and an abandoned water line ends in the southwest section. According to historical atlases discussed in Section 3.00, a street formerly extended onto the site at this location. Also, in Parcel A's paved lot, a drainage line runs north-south on the eastern section of the parking lot. An abandoned electrical line extends onto Parcel B from Pine Street, and an abandoned telephone line extends into Parcel B from Oak Street. Natural gas, water and electric lines extend onto the northeast section of Parcel B from Oak Street, and natural gas, water, electricity and sewer extend to the abandoned building on the northwest portion of Parcel B from Washington Street.

3.00 HISTORY OF THE SITE

To obtain information regarding the history of the site, GZA contacted the Boston Redevelopment Authority (BRA), Boston Assessor's Office, Building Department, and the Sanborn Mapping & Geographical Information Service of Pelham, New York.

3.10 PARCEL A

Sanborn Maps of the vicinity provided the following information (see Appendix B). An 1867 map indicated that Parcel A was divided into a number of small properties, including two carpentry shops and livery stables. An 1885 map indicates "Protective Department No. 2" at the southeast portion of the site, and a carpentry shop on the northeast portion of the site. Furniture and carpet businesses were also indicated to be on the western portion of the site. An 1895 map indicates a painting shop on the northeast portion of Parcel A and a stained glass business in the southeast portion of the parcel in addition to several other buildings. As of 1909, there appears to have been dry goods stores and carpentry shops with a blacksmith at the former "Protective Department" location. A 1929 map indicates that the Rufus F. Dawes Hotel extended from the present-day Parcel B into the northeast portion of Parcel A; a Boston Edison substation was located possibly on and/or just to the east of the southeast portion of Parcel A. A 1951 map shows the Dawes Hotel still in place and the remainder of Parcel A still occupied by several small buildings. The former Boston Edison substation was indicated to be occupied by "Electric Motor Rep." A 1989 map shows the site as it is today, occupied by parking. It is apparent that a number of structures which formerly occupied the site were demolished prior to 1989.

Additional historical information was difficult to obtain due to a lack of specific numbered street addresses for the site. Some historical maps indicate portions of the site to be addressed as 664 to 890 to 908 Washington Street, 1-13 Pine Street and 220 to 254 Marginal Street; we believe that these addresses are accurate relative to property lines delineated by BRA Parcel A. The Assessor's Office indicated that the BRA owned property in the area of the site at unspecified numbered addresses on Oak Place, Oak Street and Broadway. No information on past owners of the site was obtained from the Assessor's Office.

The Building Department files indicate that in 1921, a permit was issued for the address of 902 Washington Street to construct a building to house unspecified types of stores. A 1975 Building Department file for 902 and 908 Washington Street was issued to take down a building and fill the property to grade, and 1982 and 1983 permits granted permission for the 902 and 908 Washington Street properties to be used as a parking lot.

According to Mr. Edward Chang of CEDC, the current owners of lot R3A1 and R3A2 are CEDC and the Boston Redevelopment Authority (BRA).

3.20 PARCEL B

The same Sanborn maps were reviewed for Parcel B. The 1867 map indicated that the footprint of the current building was occupied by an armory; the rest of the site appears to have been small commercial properties. The 1885 map indicates that the buildings along Washington Street housed furniture dealers, carpet dealers and a roller skating rink and that the buildings in the northeast portion of the site are labeled "tenements." The 1895 map shows a building on Washington Street partially converted to a Salvation Army hotel and furniture dealers and tenements still present. The 1909 map indicates "elevated railroad tracks" extending behind the Salvation Army hotel. The 1929 map shows that buildings along Pine Street (southeast portion of the site) were replaced by the Rufus F. Dawes Hotel, the Salvation Army is in the Washington Street building, and the elevated railway tracks remain on the site. The

1951 map again shows Parcel B to be covered by several buildings including the Dawes Hotel and that the elevated railroad were still recorded at the site. The 1989 map shows the site to be covered by the present site building, elevated railroad tracks and a playground. All of the historical maps indicate that a street, originally labeled as Ash Street and later as Oak Place, extends onto Parcel B from the north.

Assessor's Office records reviewed in 1991 listed Edward Mascoll, et al. (884 Washington Street) and Samuel James, et al. (888 Washington Street) as property owners. City directories indicate that the building was occupied by a variety of businesses (appliance stores, pawnbrokers, furniture stores) from 1933 to 1978, when it was taken over by the Chinatown Boys Club.

Building Department records indicate that the existing building includes the addresses of 882 to 892 Washington Street. Building permits dating back to 1916 reflect both retail and manufacturing activity as well as several minor structural changes. In 1955, a company called Cambridge Engraving either sold or manufactured signs at 888-890 Washington Street. In 1972 and 1976, permits were issued to the BRA to bring the building up to code standards for the Boys Club of Chinatown. As of 1987, the owner of 882-992 Washington Street was listed as Teradyne Corporation. GZA did not observe any demolition permits in the Building Department records, although the buildings along Pine Street and Oak Street were demolished sometime between 1959 and 1989 according to the Sanborn maps. Additionally, the elevated railway tracks (a portion of the Massachusetts Bay Transportation Authority's "Orange Line") were removed sometime before June 1989.

According to Ms. Carol Lee of ACDC, the Oak Terrace Limited Partnership presently owns Parcel B.

4.00 OIL AND HAZARDOUS MATERIAL USAGE

GZA observed no current use of hazardous materials or oil at the site. However, during our initial site visit, a few small containers of spray paint, automotive paints and an empty 55-gallon drum labeled as a degreaser were observed in the first floor of the building. In addition, the southern section of the first floor that appear to have been formerly used as an automotive bay or garage, and therefore hazardous materials and oil may have been formerly stored and used in this area of the building. Other than minor surficial staining typically associated with parking areas and random rubbish disposal, we did not observe surficial evidence of the presence of oil or hazardous materials on the exterior portions of the site.

5.00 REGULATORY INFORMATION CONCERNING SITE AND VICINITY

Certain state and local agencies were contacted and certain state and federal files and lists reviewed to assess whether hazardous materials may have been released into the soil or groundwater at or near the site. Some of the information was developed by telephone contact; other information is the result of direct interviews and visits. The information made available to GZA during these visits, interviews and file reviews is summarized in the following paragraphs.

5.10 LOCAL

To obtain information concerning the possible release of hazardous material or oil at or near Parcels A and B, GZA contacted the Boston Health, Fire and Water Departments and the Clerk's Office.

The officials at the Fire Department and Clerk's Office indicated that they had no records of underground storage tanks (USTs) at the site. However, please note that GZA was unable to determine how the former site buildings were heated. It is possible that heating oil may have been used to heat the buildings and may have been stored in aboveground or underground storage tanks and not reported to the municipal Fire Department. GZA observed no records of demolition of the site buildings; if storage tanks had been present, it is possible that the tanks may have been left on the site during demolition. In addition, Fire Department records indicated no release of oil or hazardous material at the site. However, Fire Department personnel recalled a gasoline spill on Kneeland Street approximately two years ago.

The officials at the Water Department indicated that no public or private water supply wells are at or in the area of the site. In addition, the buildings in the area were indicated to receive their drinking water from the Massachusetts Water Resource Authority (MWRA).

The Health Department officials also indicated that their files indicated no information regarding the storage of hazardous materials or oil at the site.

5.20 STATE

Files made available to GZA at the Massachusetts DEP Northeast Regional Office were reviewed on April 1, 1992.

The DEP Incident Response Files and Spills Database, updated to November of 1991, indicated that 18 spills or releases of oil or hazardous materials have occurred within approximately 1/8 mile of the site:

- Medical Vet. Building, 136 Harrison Avenue: December 4, 1987 spill of various acids and cresol dithiol inside building, no floor drains affected; clean up by Clean Harbors.
- 35 Kneeland Street: 90 gallons of No. 4 fuel oil released during tank test on June 19, 1987; clean up by Clean Harbors.
- Corner of Kneeland and Washington Streets: over 2,000 gallons of cable oil released September 9, 1989 when a contractor jackhammered into cable line; clean up by Clean Harbors.
- Sunoco station located at 976 Washington Street reported two spills of gasoline in 1991; cleaned by Groundwater Environmental Services.
- Atlas Oil, 100 Shawmut Avenue: December 21, 1983 release of 10 gallons of No. 4 fuel oil; clean up by Pollution Control Unlimited (PCU).
- Exxon, Kneeland Street: February 10, 1984 release of 50 gallons of jet fuel; clean up by PCU.
- Tufts University, 136 Harrison Avenue: November 3, 1984 release of 1 gallon of toluene; clean up by Tufts; also December 4, 1987 release of 1/2 to 1 liter of various acids; clean up by Clean Harbors.
- New England Medical Center Hospital, 35 Kneeland Street: June 19, 1987 release of 90 gallons of No. 4 fuel oil; clean up by Clean Harbors.
- BECO, unidentified location on Shawmut Avenue: August 4, 1987 release of unknown quantity transformer oil; no clean up contractor listed.
- Boston University, Harrison Avenue: December 14, 1987 release of unknown quantity of unknown chemicals; clean up by Advanced Em. Tech. Company.
- MBTA, 500 Broadway: July 27, 1990 release of unknown quantity of medical waste; clean up by Clean Harbors.
- Boston Edison, corner Tremont and Kneeland Streets: September 19, 1989 release of 1,000 gallons of cable oil; clean up by Clean Harbors; also, October 31, 1989 release of unknown quantity of cable oil at unspecified address on Kneeland Street; clean up by Clean Harbors.
- Unidentified location on Kneeland Street: September 23, 1989 release of unidentified quantity of gasoline; clean up by Fire Department/Department of Public Works (DPW).

- Munson Transport, unlisted address on Kneeland Street: July 7, 1990 release of unknown quantity of diesel fuel; no clean-up contractor listed.
- Boston Herald, 300 Harrison Avenue: May 31, 1989 release of unknown quantity of gasoline/diesel fuel; clean up by Zecco, Inc.

Most of the reported quantities spilled are relatively small, and clean-up contractors were generally retained to clean up the spills; it is GZA's opinion that the spills listed above are unlikely to have had an adverse impact on the study site.

The DEP January 15, 1992 "List of Confirmed Sites and Locations To Be Investigated" (LTBI) identified two confirmed sites and an LTBI within 1/8 mile of the study site. Discount Fuel located at 739-745 Washington Street is listed as a confirmed site with a Phase 3 status, and New England Medical located at 810-864 Washington Street is listed as a confirmed site with a Phase 2 status. The Discount Fuel site is approximately 1/8 to 1/4 mile northwest and possibly upgradient of the study site; the New England Medical site is across Oak Street from Parcel B. New England Medical is a waiver site, in which the DEP has authorized a private party to proceed with cleanup actions without further DEP oversight. A Sunoco station located at 976 Washington Street is listed as an LTBI with preliminary assessment status. The Sunoco station is approximately 1/8 to 1/4 mile southwest and not upgradient of the study site.

The DEP February 6, 1992 Northeast Regional Sites Database indicated, along with the three previous sites, Boston Herald located at 300 Harrison Avenue and Waterford Place at 180 Shawmut Avenue as reserved sites with preliminary assessment status. A reserved site is an LTBI of lower priority than those included on the DEP's published list. Boston Herald is approximately 1/8 mile southwest and not upgradient of the study site.

The DEP Site Assessment files regarding the New England Medical Center (previously an MBTA station) indicated that fill samples were found to contain elevated levels of total petroleum hydrocarbons (TPHs), polynuclear aromatic hydrocarbons (PAHs), and metals. The waiver application filed for the New England Medical Center site indicated that the likely remedial response action would consist of excavation and removal of contaminated fill.

Site Assessment files for the Boston Herald site contained a letter dated July 12, 1989 from Metcalf & Eddy Technologies, Inc. of Northborough, Massachusetts to the Department of Environmental Quality Engineering (DEQE; now DEP). The letter indicated that free phase weathered petroleum product was discovered during the excavation of two 20,000-gallon fuel oil tanks near the northeast corner of the Herald building. The product was pumped from the ground using a vacuum truck, and contaminated soil was stockpiled on polyethylene sheeting. Eight monitoring wells were installed; free product was reported in two wells. The letter indicated that a Phase I - Site Investigation report was forthcoming; GZA did not find this report in DEP files.

DEP site assessment files for the Waterford Place site at 180 Shawmut Avenue contained a report by Briggs Associates, Inc. of Rockland, Massachusetts, dated August 9, 1989. The Briggs report indicate that a localized area of stained soil was encountered during excavations for pile caps for a new building. Approximately 100 cubic yards of the stained soil was excavated and stockpiled. Subsequent analysis of the soil by Briggs indicated the presence of less than 100 parts per million (ppm) TPH in the samples analyzed. No volatile organic compounds (VOCs) were detected. The source of the oil was believed to be a crushed heating oil tank which was buried in place when a former building at the site was demolished in the early 1970s. The Briggs report stated that the stained soil was to be disposed of by BFI, Inc. at Northern Disposal Company in East Bridgewater, Massachusetts pending BFI's analysis of the material. DEP files also contained a Bill of Lading indicating that approximately 150 cubic yards of contaminated soil was removed from the 180 Shawmut Street property to GCR in Peabody, Massachusetts on August 11, 1989.

GZA also reviewed the DEP Water Supply Protection Atlas, which did not indicate the presence of the following potential sources of environmental contamination within 1/4 mile of the study site; landfills, salt storage sites, surface impoundments, junkyards or hazardous waste sites. The Atlas additionally indicated no public water supply wells or reservoirs within 1/4 mile of the site.

5.30 FEDERAL

GZA reviewed the March 3, 1992 Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) list of hazardous waste generators, transporters and treatment/storage/disposal facilities registered under the RCRA. This list identified ten such companies within approximately 1/8 mile of the study site; of these, eight were listed as small quantity generators and two (New England Medical Center and Tufts University Medical School) were listed as large quantity generators. The hazardous waste generators in the vicinity of the subject site are listed in Table 1.

The EPA March 4, 1992 Facility Index System (FINDS) list of companies involved with any of 12 EPA monitoring programs included ten companies within approximately 1/8 mile of the study site; these companies are also listed on Table 1. All of the companies are included under the Hazardous Waste Data Management System (RCRA information) but the FINDS list includes three companies which were listed on the RCRA list, and does not include three other companies which were listed on the RCRA list.

The March 4, 1992 Comprehensive Environmental Response, Compensation and Liability Act Information System (CERCLIS) list of sites for possible investigation under the Federal Superfund program indicated no listings within 1/8 mile of the study site. EPA's February 25, 1992 National Priority List of Federal Superfund sites in Massachusetts did not include any sites in Boston.

Additionally, the 1981 and 1986-1992 EPA lists of companies with National Pollutant Discharge Elimination System (NPDES) permits were reviewed. They showed no companies in the vicinity of the site with NPDES permits.

EPA's Emergency Response Notification System (ERNS) list dated February 24, 1992 of spills reported to the EPA did not indicate any spills reported at or within 1/8 mile of the study site.

6.00 FIELD EXPLORATION, SAMPLING AND ANALYTICAL PROGRAM

GZA completed a field exploration program as part of the present evaluation to assess the presence of oil or hazardous materials in soil and groundwater at the site. This program consisted of the execution of a total of 19 borings (10 on Parcel A and nine on Parcel B), the installation of 14 monitoring wells (seven on each parcel), and the collection and screening analysis of soil and water samples.

To the extent feasible, initial (June 1991) exploration locations were selected to obtain soil and groundwater samples from generally upgradient and downgradient areas of the site. Boring locations were also selected so as to provide geotechnical information for the proposed site development. Locations of the borings completed during the second phase (February 1992) of exploration were selected based on the results of the initial field work. These were intended to provide additional soil and water samples for more comprehensive chemical analyses in areas of suspected contamination and to provide additional site coverage. An Exploration Location Plan is attached as Figure 2.

Similar field procedures and analytical techniques were used for both parcels, and the types of subsurface materials encountered on the two parcels were similar. Therefore, a general discussion of field procedures and geologic conditions encountered, pertaining to both parcels, is presented below. Results of the chemical analyses of soil and groundwater samples are discussed separately by parcel.

6.10 SUBSURFACE EXPLORATIONS AND MONITORING WELL INSTALLATIONS

Between June 4 and 28, 1991, 14 borings (GZA-1 through GZA-8 and GZB-1 through GZB-6) were completed by GZA Drilling, Inc. of Brockton, Massachusetts. Five additional borings (GZA-9 through GZA-13) were completed by GZA Drilling on February 24, 1992. Hollow stem auger techniques were employed without the use of water or other drilling fluids for shallow borings. Some of the June 1991 borings were advanced to greater depths (up to 107 feet) to provide geotechnical data for building foundation design. These deep borings were advanced using drive and wash methods through the overburden and a diamond bit with NX core in bedrock.

A monitoring well consisting of 10 to 15 feet of 1.5-inch-diameter PVC wellscreen attached to a solid PVC riser pipe was installed in 14 of the borings. All PVC attachments were completed without the use of solvents or glues to prevent contamination. The wellscreen was set to span the water table encountered in the boring during drilling. A filter of clean silica sand was placed in the annular space around the wellscreen, and a bentonite clay seal was placed above this filter sand. Each well was completed with a curb box at the ground surface. Well installation details are presented on the boring logs in Appendix C.

6.20 SOIL AND WATER SAMPLING

Split spoon samples were obtained by Standard Penetration Tests at 5-foot intervals during the drilling operations. Soil samples were classified by the on-site geologist; boring logs developed by GZA are attached as Appendix C. A portion of each soil sample was collected in a clean glass jar, stored in an ice-packed cooler and transported under chain-of-custody procedures to GZA's Environmental Chemistry Laboratory (ECL) for chemical screening. In addition, two surface soil samples were collected from the site on March 23, 1992.

On June 19-29, 1991 and February 24 and March 3, 1992, GZA personnel sampled the monitoring wells at the study site. Groundwater samples were obtained using 5-foot stainless steel bailers with Teflon ball check valves. A separate laboratory-cleaned bailer was used for each well to avoid cross contamination. Three times the initial standing volume of the groundwater in the well was evacuated to remove stagnant water, and the well was allowed to recharge. Water samples were collected in hydrochloric acid preserved 40-ml vials with Teflon septa, 1-liter amber jars, and in 8-ounce glass jars. The samples were kept cool and delivered under chain-of-custody procedures to GZA's ECL.

GZA measured water levels in each monitoring well with an electronic water level reader at the time of sampling. The depths to water table are indicated on the well logs in Appendix C.

6.30 GROUNDWATER FLOW DIRECTION MEASUREMENTS

To estimate the direction of site groundwater flow, GZA conducted an elevation survey on March 3, 1992 using laser level techniques and a local benchmark (a bolt on a fire hydrant as shown on Figure 3). GZA surveyed the well casing elevations and measured the depths to groundwater in the wells. The water levels in the wells are presented on Table 2 and on the boring logs in Appendix C. Groundwater elevations were calculated by subtracting groundwater depths from the wellhead elevations. Survey data and relative groundwater elevations are provided on Table 2, and a groundwater contour plan is provided as Figure 3.

6.40 CHEMICAL SCREENING OF SOIL AND WATER SAMPLES

Soil samples collected from the site were screened in GZA's ECL for total VOCs using an H-Nu Model PI-101 photoionization detector (PID) with a 10.2 electron volt lamp. The PID measures relative levels of VOCs referenced to a benzene in air standard. Although the PID screening cannot be directly used to quantify VOC concentrations or identify individual compounds, the results can serve as a relative indicator of the levels of VOCs in each sample. Laboratory PID screening results are presented on the boring logs in Appendix C, and summarized in Tables 3 and 6. A discussion of the results of the screening analyses is provided in Section 7.20.

Based on PID screening results, additional chemical screening by static headspace gas chromatograph (GC) techniques was performed on selected soil samples using a Hewlett Packard Model 5890A GC. The GC screening analysis permits the tentative identification and approximate quantification of individual VOCs. GC screening results and a description of GZA's GC screening procedures for soil are included in Appendix D; results are discussed in Section 7.20 and presented in Tables 4 and 7.

Water samples were also screened for VOCs using the GC and static headspace techniques. The GC screening procedures and results are presented in Appendix D; results are discussed in Section 7.20 and presented in Tables 5 and 8.

In addition, water samples were screened for pH and specific conductance within 24 hours of collection. The pH is a measure of the acid or basic nature of water, and specific conductance is a measure of dissolved ions in water. An Orion Research Model EA 940 Expandable Ionanalyzer was used to measure pH and an YSI Model 34 Conductivity Meter was used to measure specific conductivity. Results are presented in Tables 5 and 8 and discussed in Section 7.20.

Selected soil and groundwater samples were analyzed for TPH content by infrared (IR) spectroscopy, and additional analyses for petroleum hydrocarbons (PHCs) were conducted using GC techniques using modified ASTM Method D-3328. Selected water and soil samples were also screened at GZA's ECL for semi-VOCs. One composite soil sample from each site was submitted for broad spectrum chemical analyses which included PCBs by EPA Method 8080 (GZA ECL) and toxicity characteristic leaching procedure (TCLP) for metals, pesticides and herbicides by Matrix Analytical, Inc. of Hopkinton, Massachusetts . The analytical procedures and results are included in Appendix D; results are discussed in Section 7.20 and summarized in Tables 4, 5, 7, and 8.

7.00 FIELD EXPLORATION AND ANALYTICAL RESULTS

The following sections summarize the soil conditions encountered as well as the results of chemical screening of soil and water.

7.10 SUBSURFACE CONDITIONS

Soil conditions are summarized from the boring logs attached as Appendix C. Each of the borings encountered between 6 and 17 feet of granular fill overlying silts and clays. Borings GZA-2, GZA-4, GZB-1 and GZB-3 were advanced approximately 10 to 16.5 feet into bedrock. These borings encountered glacial till at depths ranging from approximately 71 to 87 feet below ground surface; the thickness of the till ranged from approximately 4 to 12 feet. The depth to bedrock ranged from approximately 75 feet (GZA-4) to 94.5 feet (GZB-1) below existing grade.

7.20 GROUNDWATER FLOW

Results of our groundwater elevation survey (Figure 3) indicate that groundwater flows to the southwest toward the subgrade section of the Massachusetts Turnpike and Fort Point Channel. The difference in the elevation of the watertable on the site is approximately 5 feet; the lowest watertable elevation is in well GZA-13, which is on the southeast portion of the site. Depths to groundwater ranged from approximately 6 to 13 feet based on our March 1992 measurements.

7.30 RESULTS OF CHEMICAL SCREENING ANALYSES

Results of chemical screening and analyses of soil and groundwater samples from Parcels A and B are summarized below. Laboratory reports are contained in Appendix D.

7.31 Parcel A

A total of 84 soil samples and 13 groundwater samples (six from the June 1991 sampling round and seven from the February/March 1992 sampling round) were collected for chemical screening and analysis; results are described below and summarized in Tables 3, 4, and 5.

Soil

PID readings did not indicate detectable levels of VOCs (no positive meter response) in 71 of the 84 soil samples collected from Parcel A (Table 2). PID readings ranging from 0.1 to 1.8 ppm in nine of the 13 samples which registered a positive meter response. GZA considered these readings to be within the background range typically encountered in urban areas. Slightly elevated PID readings (2.8 to 8.2 ppm) were reported in samples GZA-2, S-5; GZA-4, S-1 and S-2; and GZA-5, S-3. With the exception of GZA-2, S-5, all of these samples were collected from fill materials.

The three samples which indicated slightly elevated PID readings and eight other samples were screened for VOCs using static headspace GC techniques. VOCs were reported in four of these samples at levels close to the detection limit of the method employed. Specific compounds reported included methyl-t-butyl ether, toluene, ethyl benzene and xylenes. These compounds are common constituents of petroleum products, such as gasoline. Unknown compounds which may be other petroleum-related hydrocarbons were also reported in samples from GZA-4, GZA-5 and GZA-8.

Based on the PID screening data, 11 soil samples were analyzed for TPH by IR methods; TPH concentrations ranged from 18 to 5,400 ppm (Table 3). Two individual samples (GZA-11, S-4 and GZA-13, S-2) and two composite samples (composite A consists of samples S-1, S-2 and S-3 from GZA-11 and samples S-1 and S-2 from GZA-13, and Composite 1 consists of samples S-1 and S-2 from GZA-13) were analyzed for PHCs by GC methods; results ranged from 53 to 440 ppm. TPH IR methods are subject to a number of interferences which can artificially elevate measured PAH concentrations. Accordingly, we believe that the GC results more accurately reflect conditions at the site.

The samples screened for PHCs were also screened for semi-volatile organic compounds. A number of polycyclic aromatic hydrocarbons (PAHs) were reported, at total concentrations ranging from 5.9 to 82 ppm. PAHs are byproducts of coal combustion and automobile exhaust and are commonly found at similar concentrations in urban fill. No other semi-volatile organic compounds were detected.

Composite A was analyzed for total lead content; 265 ppm of lead was detected. While this concentration is slightly elevated compared to natural background levels, it is within the range commonly observed in urban areas. Sources of lead in urban soils include automobile exhaust and lead paint chips.

Composite A was also submitted for TCLP analysis for metals, pesticides and herbicides. The metals results indicated a barium concentration of 0.430 ppm, and a lead concentration of 0.230 ppm in the sample leachate; these concentrations are below applicable standards for these metals. None of the remaining six metals analyzed were detected, and no pesticides or herbicides were reported.

GZA's laboratory analyzed Composite A for PCBs by EPA Method 8080; none were detected.

Groundwater

No VOCs were detected in GZA's GC screening of the six groundwater samples collected from Parcel A in June 1991, with the exception of five unknown compounds in the sample from GZA-4 (Table 5). This sample was submitted for TPH-IR analysis; the TPH level was below the detection limit for the technique employed (1 ppm).

No VOCs were detected in four of the seven groundwater samples collected in March 1992. Four unknown VOCs were reported in sample GZA-4. Six unknown VOCs and 36 parts per billion (ppb) of toluene were detected in sample GZA-11, and a trace of m,p-xylenes and 22 unknown compounds were detected in sample GZA-13. Toluene and xylenes are common constituents of petroleum products, such as gasoline and diesel fuel. Unknown compounds reported in these samples may also be petroleum-related hydrocarbons.

PHC analysis of samples GZA-2, GZA-4 and GZA-13 did not indicate the presence of PHCs in any of the samples above the 0.5 ppm method detection limit.

Samples GZA-4, GZA-11 and GZA-13 were screened for semi-VOCs; none were detected with the exception of the PAH compounds benzo-a-anthracene and chrysene in GZA-11; both were present at concentrations below the minimum quantification level (BMQL) of the screening procedure (0.005 ppm).

The pH of the groundwater samples ranged from 6.6 to 8.8. The higher pH readings may be associated with concrete in the fill material. Specific conductance ranged from 596 to 5,540 μmhos/cm. These readings are elevated for New England groundwater but are within the ranges commonly observed at urban sites. Elevated conductance may be related to the impact of residual amounts of brackish water due to the marine origin of site sediments.

7.32 Parcel B

A total of 92 soil samples and nine groundwater samples (four from the June 1991 sampling round and five from the February/March 1992 sampling round) were collected from Parcel B.

Soils

PID screening did not indicate detectable levels of VOCs in 59 of the 92 soil samples (Table 5) from Parcel B. PID readings of approximately 2 ppm or less were reported in 27 of the 33 samples in which VOCs were detected; GZA considers these levels to be within the background range typically observed in an urban area. Readings between 6.8 and 65 ppm were detected in soil samples GZB-1, S-2 and S-3; GZB-3, S-2; GZB-5, S-5 and S-6; and GZB-6, S-3. With the exception of the samples from GZB-5, all of the elevated VOC readings were observed in samples from the fill.

Based on the PID readings, 10 soil samples were selected for GC screening. With the exception of the samples from GZB-3, none of the 23 common VOCs identified by GZA's GC screening technique were identified in the samples. Trace levels of toluene, ethyl benzene and xylenes (compounds often associated with petroleum products) were detected in GZB-3, S-1 and S-2. Unknown VOCs were reported in all of the samples except GZB-4, S-5. Trace to moderate levels of late eluting compounds were detected in GZB-2, S-1; GZB-3, S-1; and GZB-5, S-5 and S-6. Trace to high levels of variously eluting compounds were detected in GZB-1, S-1, S-3 and S-4. The pattern of the chromatogram for GZB-6, S-3 indicates the presence of an unknown petroleum distillate such as fuel oil.

Based on the GC and PID screening results, 13 soil samples were submitted for TPH-IR analysis (Table 7). The results indicated TPH levels between 75 ppm and 1,500 ppm for soil samples GZB-1, S-2, S-3; GZB-2, S-1, GZB-3, S-1, S-2; GZB-5, S-6; and GZB-3, S-3; non-detectable levels of TPH were reported samples GZB-1, S-4; GZB-2, S-3; GZB-3, S-3 and S-18; GZB-4, S-5; and GZB-5, S-5. Four soil samples including two composite samples were analyzed for PHCs by GC methods; PHC concentrations ranged from 280 to 830 ppm. The PHC concentrations in the composites were lower than those measured in individual samples. Composite 2 consists of samples GZA-9, S-1 and GZA-10, S-1, while Composite B consists of the S-1 samples from borings GZA-9, GZA-10 and GZA-12. PHCs from the February 1992 soil samples were qualitatively identified as components of a product in the fuel oil No. 6/asphalt boiling range.

The samples submitted for PHC analysis were also screened by GZA for semi-volatile organic compounds. The screening indicated the presence of a number of PAHs at total concentrations ranging from 1.1 to 68 ppm. As noted previously, PAHs are commonly found at similar concentrations in urban fill. No semi-volatile organic compounds other than PAHs were detected.

Results of analysis of Composite B for total lead indicated a lead concentration of 245 ppm; while slightly elevated above natural background levels, this concentration is not unusual for an urban area.

TCLP analysis of Composite B for metals did not indicate the presence of seven of the eight RCRA metals above the method detection limit. Barium was reported at a concentration of 0.46 ppm; this concentration is below the applicable standard for barium. No pesticides or herbicides were detected.

GZA's PCB screening of Composite B indicated the presence of 0.012 of PCB Aroclor 1260. This level is just above the method detection limit of 0.01 ppm.

Groundwater

The pH of the groundwater ranged from 6.6 to 8.1 (Table 7), which is within the normal range for groundwater in New England. The conductivity ranged between 561 and 3,120 μmhos/cm, which is elevated high for New England groundwater. However, based on the urban setting and the marine origin of most of the sediments, the high conductivities may be due to residual salt water trapped within the sediment or road salting practices.

Identifiable VOCs were not reported in samples collected in June 1991 analyzed by headspace GC techniques. However, in a sample from well GZB-1, the results indicated trace to low levels of eight early and late eluting compounds. Based on the VOC screening results, a duplicate sample from GZB-1 was analyzed by TPH IR methods. The results revealed 18 ppm of PHCs.

Results of the February/March sampling round indicated the presence of trace concentrations of m,p-xylenes in sample GZB-1, as well as two unknown VOCs. A trace concentration of toluene, 39 ppb ethyl benzene, 275 ppb total xylenes and 40 unknown VOCs were detected in sample GZA-12.

Groundwater samples from wells GZB-1, GZB-5 and GZA-12 were screened for PHCs; none were reported above the 0.5 ppm detection limit. Samples from GZB-5 and GZA-12 were also screened for semi-VOCs; none were detected.

8.00 POTENTIAL MIGRATION PATHWAYS, EXPOSURE POINTS, AND RECEPTORS

As required under the MCP 310 CMR 40.00 (2)(b), GZA identified potential pathways of contaminant migration, exposure points, and human and environmental receptors of the contamination detected at the BRA Parcels A and B site in Boston Massachusetts. This discussion is based on information presented in this report and state and federal documents regarding environmentally sensitive receptors.

8.10 POTENTIAL MIGRATION PATHWAYS

Under current site conditions, the potential migration pathways for the detected contaminants include the leaching of soil contaminants (VOCs, PAHs, metals and PCBs) into groundwater and the migration of contaminated groundwater to Fort Point Channel approximately 2,000 feet downgradient of the site. Additionally, contaminated surficial soils may erode during the future construction planned for the property and wash into the storm sewer system, leading to eventual discharge into a downgradient surface water body.

The potential exists for the release of vapors and fugitive dust from contaminated soil and the volatilization of VOCs from the contaminated groundwater under the future construction scenario.

8.20 IDENTIFICATION OF EXPOSURE POINTS AND RECEPTORS

Environmentally sensitive areas as defined by the MCP include wetlands, areas subject to 100-year flooding and sensitive terrestrial and aquatic habitats. GZA has reviewed a number of state and Federal sources for information regarding the presence of such environmentally sensitive areas within the vicinity of the BRA Parcels A and B. These sources are listed below:

- U.S.G.S Topographic Map, Boston North Quadrangle (dated 1984);
- U.S. Fish and Wildlife Service, National Wetlands Inventory Map (NWI) (Boston North Quadrangle);
- Massachusetts Department of Environmental Protection, Division of Water Pollution Control (DWPC), Basin Classifications and Maps (310 CMR 4.06);
- U.S. EPA, Region I list of Priority Wetlands in New England (dated September, 1987);
- Massachusetts Natural Heritage Program (MNHP), Atlas of Estimate Habitats of State-listed Rare Wetlands Wildlife, 1992 Edition;

- July 1991 list of Areas of Critical Environmental Concern (from Department of Environmental Management, Division of Resource Conservation).

8.21 Potential Human Health Receptors

Given the current use of the property and the presence and potential for migration of contaminants described above, the likelihood of contact between potential human receptors (i.e. trespassers) and the contaminated soil and groundwater media is low due to the fact that the area is fenced.

Construction on the site may expose construction workers to contamination through direct contact with surficial and subsurface soils and groundwater, and inhalation of fugitive dust.

Several factors may serve to mitigate the potential for exposures to human receptors. Construction activities are planned to begin in approximately six months and are likely to result in additional fencing around the parcel and increased security, which will minimize the potential for trespassing activities and subsequent exposure to site media. In addition, construction activities are governed by OSHA regulations and standards, which include specific provisions to limit direct contact to contaminated soils and groundwater.

8.22 Potential Environmental Receptors

The current setting of the site is urban/residential in nature. The site lies approximately 2,000 feet upgradient of the Fort Point Channel, which is part of Boston Inner Harbor. Fort Point Channel is considered part of the Boston Harbor Drainage System. While this area has Class SB status under the Massachusetts Surface Water Quality Standards (314 CMR 4.00) and can therefore technically be used for primary contact recreation, the water has poor aesthetic quality and is not likely to be used for this purpose. The channel is also, under these standards, designated as habitat for shellfish, other fish, and wildlife. However, past pollutant input due to urbanization of the area and the resultant poor water quality are likely to have greatly reduced the diversity of aquatic life.

Boston Inner Harbor and its nearby tributaries have been impacted by the urban nature of their surroundings. The Inner Harbor has been described by the Massachusetts Division of Marine Fisheries as anoxic in most portions for the greater part of the year. Fish which may be found in the oxygenated portions of the Harbor include winter Flounder (Pseudopleuronectes americanus), Alewife (Alosa pseudoharangus), Smelt (Osmeridae) and River Herring (Clupeidae). Commercial fishing is not allowed in the Inner Harbor and recreational fishing is generally not a recognized activity due to low fish abundance and diversity. However, some recreational fishing does occur in this area.

Potential direct exposure pathways for plants and wildlife most commonly associated with contaminated sites include some or all of the following: exposure to contaminated groundwater upon discharge to a surface water body, exposure to contaminated surface water and sediments, uptake of contaminated groundwater by plant roots, and exposure to contaminated soils. As with humans, exposure may take the form of direct contact, inhalation and ingestion. However, potential effects data associated with many plant and wildlife exposure scenarios are often limited. The exposure pathways considered for this site include off-site exposure to contaminated groundwater discharging to Fort Point Channel.

The levels of VOC detected in the site groundwater were compared to the U.S. Ambient Water Quality Criteria for the protection of marine life and found to be below these values. For this reason, it does not appear that the site contamination will have any adverse effects on the primary exposure point, Fort Point Channel.
It is also well known that, in general, VOCs must be present in relatively high concentrations in surface water to elicit toxic effects (in aquatic biota). It is likely that the concentrations of VOCs in site groundwater will be further diluted and attenuated (due to biodegradation, adsorption, and volatilization) before and after the groundwater discharges to surface water.

9.00 SUMMARY AND CONCLUSIONS

A Phase I - Limited Site Investigation was conducted at the BRA Parcels A and B on Washington Street in Boston, Massachusetts. The study included a site reconnaissance; a review of the site history; a review of available local, state and federal regulatory records; subsurface explorations, and chemical analyses of soil and groundwater samples. On the basis of the work conducted as part of this study, we have reached the conclusions described below:

- The site is located near the Chinatown section of Boston, Massachusetts. Two schools, the Josiah Quincy School and the Don Bosco High School, are on the opposite side of Washington Street and within 500 feet of the site. The site is currently covered by an abandoned six-story building, paved and unpaved automobile parking areas, a playground, and the remnants of a vegetable garden. During our initial site reconnaissance, a few cans of spray paint, and automotive paint and an automobile garage bay were observed in the first floor of the site building. No evidence of a the presence of hazardous material or oil were observed on the ground surface except for occasional isolated oil-like stains typically observed on automobile parking lots.

- Our historical review indicated that several small site buildings housed businesses such as a carpentry shop, a livery stable, a hotel, a stained glass shop, a blacksmith shop, an armory, a furniture shop, a carpet shop, an appliance store, and an engraving shop. In addition, a substation, an elevated railway track, a playground, and a portion of a city street were also on the site.

- Our review of municipal agency files did not indicate a release of hazardous material or oil at the site. The site was indicated to be serviced by municipal water and sewer services. No private or public supply wells were identified to within 1/4 mile of the site.

- Review of DEP records did not indicate any reports of a release of hazardous material or oil at the site; however, several releases were indicated to have occurred within 1/4 mile of the site. Several businesses registered as RCRA hazardous waste generators were also indicated to be within 1/4 mile of the site. The DEP Water Supply Protection Atlas indicated that no public drinking water supply wells or reservoirs are within 1 mile of the site.

- Subsurface conditions consist of between 6 and 13.5 feet of granular fill overlying natural silts and clays. Four deep borings encountered glacial till at depths ranging from 71 to 87 feet below ground surface and bedrock at depths of approximately 75 to 94.5 feet below ground surface. Groundwater was encountered at depths of approximately 6 feet to 13 feet below ground surface. Results of our groundwater elevation survey indicate that groundwater flows to the southeast toward the Massachusetts Turnpike and the Fort Point Channel.

- Results of our chemical analyses of soil and groundwater samples generally indicated the presence of contaminants typically associated with urban sites. Chemical analyses of soil samples detected low levels of aromatic and petroleum-related VOCs, up to 5,400 ppm of PHCs, 1.1 to 82 ppm of PAHs, and 245 to 265 ppm of lead in soil samples from Parcels A and B. Chemical analyses results of groundwater samples detected low levels of aromatic VOCs and unknown compounds in five of 12 groundwater samples, a low level of PHCs in one of six groundwater samples, and levels below method quantification limits of two PAHs.

On the basis of the observations made and the information reviewed during the course of this Phase I - Limited Site Investigation as described above, it is GZA's opinion that the site is a "disposal site" as defined under the MCP. It is GZA's opinion that the site should be classified as a non-priority disposal site and that no Short-Term Measure is warranted due to the limited potential for exposure to site contaminants. Although two schools are located within 500 feet of observed contamination at the site, we do not believe the site poses an increased risk of exposure to children from the schools. In addition, it is also GZA's opinion that the site is eligible for a Waiver of Approvals for possible remediation of contaminated soils during the planned future development of the site.

While our testing results indicate the presence of hazardous materials in soils from the site, the limited analyses completed to date indicate that soils excavated during proposed construction would not be classified as hazardous wastes. Based on our recent discussions with DEP on similar projects, however, the fill material at the site will most likely be classified as a regulated soil requiring DEP approval for off-site disposal.

10.00 RECOMMENDATIONS

The presence of contaminated soils and groundwater at the site does not, in GZA's opinion, preclude development of the parcel. However, site planning and subsequent developments should proceed with caution to limit adverse environmental effects. Specifically, GZA recommends the following regarding site development.

1. A full asbestos survey should be conducted in the existing building on Parcel B prior to demolition of the structure. The survey should be conducted by a qualified asbestos removal contractor.

2. Given the nature of past users of the site, there is a potential for aboveground and underground storage tanks to exist at the site. Localized zones of soil contamination may also exist in areas where borings were not completed. Excavation during proposed site development should be closely monitored by a qualified geotechnical engineer with hazardous waste management experience.

3. The proposed development will leave the site covered with asphalt, landscaped areas and/or structure, thus limiting future human exposure to soils. During construction, however, there will be soil excavated for foundation construction and utility installation. The contractor should be informed of the environmental concerns at the site so that he can take appropriate health and safety precautions for his workers and occupants of surrounding sites including the nearby schools.

4. Soils excavated during construction should be disposed in accordance with relevant state and federal guidelines. Appropriate technical specifications should be developed by the geotechnical engineer with regard to this issue. As an alternative to stockpiling and testing during construction, the soil at the site could be characterized prior to construction. This, however, would involve additional exploration and chemical testing to better evaluate the extent and composition of potentially contaminated material. The required testing would have to satisfy both the DEP and facilities where the material will be disposed. Although this may involve more testing than the "test-as-we-go" approach, it will

reduce the amount of on-site stockpiling and time-consuming testing, which could impact on the construction schedule. Also, the DEP still recommends full-time monitoring during excavation operations to confirm that conditions are as expected based on the boring program.

5. Dewatering may be required for construction activities at the site, and special provisions should be made for handling the pumped water. These may include procurement of environmental permits and/or monitoring of effluent water quality. GZA, therefore, suggests that the permitting process begin as soon as possible because of the long lead times involved with obtaining the necessary permits.

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File No. 12854-C, PC

Ms. Carol Lee
ACDC and CEDC
360-B Tremont Street
Boston, Massachusetts 02116

Re: Remedial Cost Estimates
BRA Parcels A and B
Washington Street
Boston, Massachusetts 02116

Dear Ms. Lee:

In accordance with our Proposal dated February 10, 1992, GZA GeoEnvironmental, Inc. (GZA) is pleased to submit the following approximate cost estimates for remediation of the above-referenced site and certain premium costs for construction associated with contaminated soils in the subsurface at the site. These estimates are subject to the assumptions and limitations presented in this letter and in Attachment A to this letter, and to the Statement of Terms and Conditions attached to our Proposal.

INFORMATION SOURCES AND BACKGROUND

Our estimates are based on the information obtained during recent investigations conducted by GZA for these parcels. These investigations include:

- an environmental site evaluation;
- a Phase I - Limited Site Investigation conducted in accordance with the Massachusetts Contingency Plan (MCP); and
- a public health and environmental risk characterization.

Parcels A and B are collectively an approximately 2-acre tract of land occupied by an abandoned six-story building, a playground, unpaved parking areas, and a garden and lawn area. The site is in the Chinatown section of Boston immediately north of the Massachusetts Turnpike.

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We understand that planned development at the site includes the construction of at least three residential structures ranging in height from three to 10 stories; that these structures will encompass most of Parcel B and that current estimates are that approximately 3,000 yd^3 of soil will be excavated during this construction. We also understand that development plans for Parcel A have not yet been finalized. We also anticipate that dewatering may be required during construction at Parcel B to lower the groundwater table below its natural depth of approximately 6 to 12 feet below the existing ground surface.

IDENTIFIED CONTAMINATION AND RISKS

The environmental investigation conducted by GZA at this site indicated that both saturated and unsaturated zone soils contain elevated levels of petroleum hydrocarbons and lead (>100 mg/kg). The identified petroleum hydrocarbons appear to be primarily heavier constituents including total polyaromatic hydrocarbons (PAHs) at concentrations up to 82 mg/kg. Based on these analytical results, we anticipate the Massachusetts Department of Environmental Protection (DEP) would identify the soil as "Urban Brown" (regulated soil) in accordance with their draft guidelines.

Our investigations have identified certain environmental and/or health risks associated with this contamination. These are:

- Risks to workers during construction primarily associated with contact and ingestion of contaminated soils.
- Risks to site trespassers prior to and following construction due to contact with, and ingestion of, contaminated surficial soils.

Our investigation also indicates that, though groundwater contamination is present, it does not appear to pose significant risks to public health or the environment.

SCENARIO EVALUATED

We have assumed the following will be done to limit the identified risks:

- To limit risks to construction workers, health and safety procedures will be established and followed during construction.
- To limit contact with surficial soil, the top 1 foot of soil from across the site will be excavated and replaced with clean fill. For the 2-acre site, this corresponds to approximately 3,200 yd^3 of material.

In addition to this, the soil to be excavated during construction will need to be managed in an environmentally acceptable manner.

Based on this assumed scenario, our remedial cost estimate includes cost estimates for:

- preparation and implementation of a health and safety plan for construction;
- excavation and management of soil from the top 1 foot across the site and of excess soil generated during construction; and
- placement of clean soil to replace soil removed from the top 1 foot.

We have also assumed that, due to the relatively low concentrations of contaminants detected in the groundwater, groundwater will not require treatment, either during or following construction. However, this issue must be further addressed prior to actual construction and permits for discharge of construction dewatering effluent may be required.

ASSUMPTIONS AND ESTIMATES

To develop remedial cost estimates, we made assumptions regarding site characteristics, extent of contamination, cleanup goals, etc. The assumptions and estimates developed are outlined below, and have been based primarily on available analytical data.

Assumptions Regarding Contamination

On the basis of the information regarding contamination at the site, GZA has made the following assumptions regarding the identified contamination:

- Petroleum hydrocarbons (PHCs), PAHs and lead are the only site contaminants;
- the soil would be classified by the DEP as Urban Brown (regulated soil);
- the unsaturated zone soil and groundwater samples which were collected and analyzed are representative of subsurface conditions (particularly those regarding contamination) at the site; and
- natural soils underlying the fill at the site will not require remediation.

Other Major Assumptions

The following represent other major assumptions made for our analysis:

- all construction operations can be performed at low levels of personal protection (Level D or modified Level D). It is assumed that no respiratory protection will be necessary during site remediation or construction activities; and
- groundwater extracted during construction (for the purposes of construction-phase dewatering) will not require treatment.

MANAGEMENT OF CONTAMINATED SOIL

At this time and with the limited knowledge of the preliminary construction plans for the foundation of the proposed development on the site, GZA can not accurately estimate the amount of soil that will be excavated. The limited information we have at this time indicates that approximately 3,000 cubic yards of soil will be excavated on Parcel B for construction and that an additional approximately 1,000 to 2,000 cubic yards will be excavated from the top 1 foot of both parcels to limit exposures to contaminated soil. We have very limited information regarding the proposed future construction for Parcel A and therefore cannot estimate the amount of soil to be excavated for construction from that parcel. Therefore, for reference purposes, we have prepared cost estimates for three soil volumes: 1,000, 3,000, and 6,000 cubic yards.

Options for Management of Excavated Soil

Depending on the levels of contamination present, there are several options available for management of the excavated soil. These options include:

- Reuse on site. Soil that does not contain significant levels of contaminants (e.g., total petroleum hydrocarbons less than 300 mg/kg, total polyaromatic hydrocarbons less than 100 mg/kg) can be reused on site as fill material in areas that are not environmentally sensitive. The results of our chemical analyses indicate that a portion of the material tested (e.g., 25 to 50 percent) could fall into this category. The marginal costs associated with this activity are limited to field screening, stockpiling and chemical analyses and are on the order of $20 to $30 per cubic yard.
- Use as landfill cover material. Petroleum contaminated soil that does not contain significant amounts of volatile organic compounds (VOCs)

may be reused as daily landfill cover material. The results of our chemical analyses indicate that a portion of the material tested (e.g., 50 to 75 percent) could fall into this category. The marginal costs associated with this activity are approximately $80 to $90 per cubic yard, including field screening, chemical analyses, stockpiling, transport and disposal.

- Recycling into asphalt. Soil that contains significant concentrations of petroleum hydrocarbons but does not contain significant (i.e., less than 4 mg/kg) concentrations of chlorinated hydrocarbons can be recycled into asphalt. The results of our chemical analyses indicate that a small portion of the soil tested (e.g., 10 to 25 percent) would need to be managed in this manner. The marginal costs associated with this activity are on the order of $120 to $140 per cubic yard, including field screening, chemical analyses, stockpiling, transport and recycling.

- Off-site disposal. Soil that contains significant levels of contamination must be disposed out of state in a landfill. The results of our chemical analyses indicate that none of the soil tested would fall into this category. The marginal costs associated with this activity are on the order of $400 to $500 per cubic yard, including field screening, chemical analyses, stockpiling, transport and disposal.

Note that in all cases above, soil in any of the categories may be managed in a more stringent and costly manner if so desired. Thus, soil that could be reused on site could also be reused as daily landfill cover material, recycled into asphalt or disposed out of state.

COST ESTIMATES

Estimated Cost for Soil Management

Table 1 presents the estimated marginal costs associated with soil management for a number of scenarios. These include:

- all soil reused on site;
- all soil reused as daily landfill cover material;
- all soil recycled into asphalt;
- all soil disposed out of state;

- twenty-five percent of the soil reused on site, 50 percent reused as daily landfill cover material, and 25 percent recycled into asphalt; and

- fifty percent reused as daily landfill cover material, 50 percent recycled into asphalt.

As the data indicate total soil management costs could range from less than $20,000 to more than $1,000,000 depending upon soil volumes involved and disposal options.

Other Costs

The costs associated with increased health and safety during construction will probably be on the order of $25,000 to $50,000. The costs for bringing in clean fill to replace the, surficial soil removed to limit exposures, will probably be on the order of $10 per cubic yard. Note that we have not included costs associated with completing additional MCP related studies at the two parcels.

LIMITATIONS

These estimates are subject to the attached Remedial Cost Estimate Limitations. All estimates presented herein are preliminary and subject to change. Actual costs may vary significantly from those presented herein. This is due, in part, to the fact that the estimated concentrations and extents of contaminants are based on limited data. Additionally, remediation costs are variable and subject to change due to a variety of factors including market conditions, site conditions, and changes in regulatory policies, standards and guidelines.

Regulations governing the management of contaminated material change frequently and interpretation of these regulations vary between state and federal offices dependent on the jurisdiction of the local office involved. Although GZA has applied current scientific and engineering practices and its professional judgment and experience to arrive at the estimated cost of remediation, the actual extent and concentration of contaminants will not be known until the time of remediation.

Please note that GZA does not guarantee the accuracy of these estimates as compared to so called "contractors' bid" prices.

We trust that this letter meets your requirements. Please do not hesitate to contact us if you have any questions or comments.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

James R. Bossange
Project Manager

Albert J. Ricciardelli
Consultant/Reviewer

Charles A. Lindberg

Charles A. Lindberg
Associate Principal

JRB/CAL:lr
Attachment: Remedial Cost Estimate
Remedial Cost Estimate Limitations (1/1/91)

File No. 12854
04/15/92:lr/ck

COSTS FOR A RANGE OF SOIL MANAGEMENT SCENARIOS

Scenario	Amount of Soil Excavated (cubic yards)		
	1,000	3,000	6,000
100% Reuse On Site*	$10,000-$20,000	$30,000-$60,000	$60,000-$120,000
100% Reuse as Daily Landfill Cover Material	$80,000-$90,000	$240,000-$270,000	$480,000-$540,000
100% Recycling into Asphalt	$120,000-$140,000	$360,000-$420,000	$720,000-$840,000
100% Out of State Disposal*	$400,000-$500,000	$1,200,000-$1,500,000	$2,400,000-$3,000,000
25% Reuse On Site, 50% Resuse as Daily Landfill Cover Material, 25% Recycle into Asphalt	$75,000-$85,000	$225,000-$255,000	$450,000-$510,000
50% Reuse as Daily Landfill Cover Material, 50% Recycle into Asphalt	$100,000-$115,000	$300,000-$345,000	$600,000-$690,000

*Unlikely scenarios presented for the purpose of comparison.

SECTION 02110 - SITE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes the following:

1. Removal of trees and other vegetation.
2. Topsoil stripping.
3. Clearing and grubbing.
4. Removing above-grade improvements, including paving, walkways, curbing, and amenities.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Demolition of underground structures, including utilities, is included in Section 02200, "Earthwork".
2. Handling and removal of contaminated topsoil is included in Section 02___, "Handling Contaminated Soil".

1.3 PROJECT CONDITIONS:

A. Traffic: Conduct site clearing and demolition operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements beyond the limit of work or indicated to remain in place.

1. Restore damaged improvements to their original condition, as acceptable to property owners.

C. Hazardous materials: Comply with the requirements of Section 02___, "Handling Contaminated Soil" for topsoil. The responsibility for determining presence of hazardous materials in paving to be removed and method of disposal of same is included in the work of this Section.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SITE CLEARING:

A. General: Remove trees, shrubs, grass and other vegetation or obstructions on site unless specifically indicated otherwise. "Removal" includes digging out and off-site disposing of stumps and roots.

B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches.

1. Strip topsoil to whatever depths encountered.
2. Dispose of topsoil same as specified for disposal of waste material unless otherwise indicated in another Section.

C. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation.

1. Completely remove stumps, roots, and other debris protruding through ground surface.

D. Removal of Improvements: Remove existing above-grade improvements as indicated and necessary to facilitate new construction.

1. Removal of below-grade improvements is specified in Section 02200, "Earthwork".
2. Coordinate with work of Section 02200 and provider companies as required for site utilities to be removed.

3.2 DISPOSAL OF WASTE MATERIALS:

A. Burning: Burning is not permitted on Owner's property.

B. Removal: Transport waste materials and topsoil from Owner's property and legally dispose off site.

1. Hazardous materials: Remove and dispose of hazardous materials, if present in paving or waste materials other than soils, produced as part of the work of this Section, in a legally proscribed manner.

END OF SECTION 02110

SECTION 02160 - EXCAVATION SUPPORT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes, but is not limited to, the following:

1. Designing, installing, maintaining, and removing as required, shoring and bracing necessary to protect existing streets, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.

B. Types of shoring and bracing systems include, but are not limited to, the following:

1. Steel sheet piles.

C. Building excavation is specified in Section 02200, "Earthwork".

1.3 SYSTEM DESCRIPTION:

A. Performance: Design, engineer, fabricate, and install sheet piling excavation support system at Washington Street property line to support earth, water, and predictable surcharge loads to allow safe and expeditious construction of structures and the following:

1. Protect adjacent street, sidewalk and utility structures from damage.
2. Penetration of support systems shall be to adequate depth below bottom of excavation to permit lowering of indicated bottom of excavation at least three feet without any change in support system and without exceeding allowable movement limits.
3. Bracing system as required to maintain stability of excavation sides and bottom.

B. Movement Limit: Allowable lateral ground movement shall not exceed 1 inch along Washington Street property line.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.

B. Shop drawings detailing fabrication and erection of excavation support system. Include plans showing layout, materials and equipment, details of support systems and their connections.

1. Include structural calculations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified professional engineer that was responsible for their preparation.

1.5 QUALITY ASSURANCE:

A. Engineer Qualifications: Professional engineer licensed to practice in Massachusetts and experienced in providing engineering services of the kind indicated.

B. Supervision: Engage and assign supervision of excavation support system to a qualified professional engineer foundation consultant.

C. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

D. Comply with ASTM A 328, "Standard Specifications for Steel Sheet Piling".

1.6 EXISTING UTILITIES:

A. Notify municipal agencies and service utility companies having jurisdiction. Comply with requirements of governing authorities and agencies for protection, relocation, removal, and discontinuing of services.

B. Consult site survey and official records of existing utilities, both surface and subsurface, to be fully informed of all existing conditions and limitations as they apply to this work.

1. Protect existing active sewer, water, gas, electricity and other utility services and structures to remain in accordance with requirements of authorities having jurisdiction.

1.7 JOB CONDITIONS:

A. Boring logs and locations are contained in Section 01900, "Existing Conditions".

B. Coordinate location of excavation support system with city officials. Obtain requisite sidewalk occupancy permits and other approvals as required at no cost to the Owner.

C. Install sheet piles during normal working hours to minimize disturbance by transmission of noise or vibration to nearby structures.

D. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs to record any existing settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs, and signed by Contractor and others conducting investigation.

E. Survey adjacent structures and improvements, employing qualified professional engineer, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

F. During excavation, resurvey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General: Provide adequate shoring and bracing materials which will support loads imposed. Materials need not be new, but should be in serviceable condition.

B. Steel Sheet Piles: ASTM A 328, continuous interlocking type.

1. Sheet pile splices shall be full butt welds designed to develop full strength of the sheet pile both in bearing and in bending. Welded piles shall be straight.

C. Timber Lagging: Any species, rough-cut, mixed hardwood, nominal 3 inches thick, unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Verification of Conditions: Locate and identify site conditions which may interfere with work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 SHORING:

A. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.

B. Seal leaks in sheeting to prevent penetration of fines, loss of soil, or excavation bottom instability.

3.3 BRACING:

A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move a brace, install new bracing prior to removal of original brace.

B. Do not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to Architect.

C. Install internal bracing, if required, to prevent spreading or distortion of braced frames.

D. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

E. Remove sheeting, shoring, and bracing in stages to avoid disturbance to underlying soils and damage to pavements, facilities, and utilities.

F. Repair or replace, as acceptable to Architect, adjacent work damaged or displaced through installation or removal of shoring and bracing work.

END OF SECTION 02160

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes the following:

1. Demolition of paving, curbs, surface structures, and subsurface structures and utilities, to the extent not included in other Sections.
2. Excavation and removal of unsuitable or excess soils to the extent not included in other sections.
3. Preparing of subgrade for building foundations, slabs, walks, and pavements.
4. Excavating and backfilling of trenches within building lines.
5. Excavating and backfilling for underground site, mechanical and electrical utilities and buried mechanical and electrical appurtenances.
6. Finish grading to indicated lines and levels.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 01050, "Field Engineering", for layout and survey work.
2. Section 01500, "Temporary Facilities", for dewatering excavations by this Section.
3. Section 01900, "Existing Conditions", for boring logs and soil profiles.
4. Section 02110, "Site Preparation", for removal of above-ground improvements, utilities, and stripping of topsoil.
5. Section 02160, "Excavation Support Systems" for sheet piling support sytems.
6. Section 02220, "Handling Contaminated Soil", for handling and disposal of contaminated soil materials.
7. Section 02600, "Water and Fire Service Piping", for new water service installed in trenches excavated and backfilled by this Section.
8. Section 02700, "Sanitary and Storm Sewerage Systems", for sewerage work installed in trenches and backfilled by this Section.

9. Section 03300, "Cast-In-Place Concrete", for requirements for concrete materials.

1.3 DEFINITIONS:

A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.

C. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular subbase, drainage fill, or topsoil materials.

D. Structure: Buildings, foundations, slabs, curbs, or other man-made stationary features occurring above or below ground surface.

1.4 SUBMITTALS:

A. Test Reports: Submit the following reports directly to Architect from the testing services, with copy to Contractor:

1. Test reports on borrow material.
2. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
3. Field reports; in-place soil density tests.

B. Samples: Submit fifty pound (50-lb.) sample of each type of fill to testing laboratory in air-tight containers at least seven (7) days prior to use.

1.5 QUALITY ASSURANCE:

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Testing and Inspection: The Owner shall employ and pay for a qualified independent testing laboratory to perform soil testing and inspection service during earthwork operations. Comply with the following testing standards:

1. ASTM C 136 - Method for sieve analysis of fine and coarse aggregates.

2. ASTM D 1556 - Test method for density of soil in place by the sand cone method.
3. ASTM D 1557 - Test methods for moisture-density relations of soils and soil aggregate mixtures using ten pound hammer (10 lb.) and eighteen-inch (18") drop.
4. ASTM D 2922 - Test methods for density of soil and soil-aggregate in place by nuclear methods (shallow depth).
5. ASTM D 4318 - Test method for liquid limit, plastic limit, and plasticity index of soils.

1.6 PROJECT CONDITIONS:

A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is the Contractor's responsibility to make interpretations and draw conclusions based on the character of materials to be encountered and the impact on his work based on his expert knowledge of the area and of earthwork techniques. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

   1. Review logs of borings, jar soil samples, records of explorations and other pertinent data for the site. After obtaining Owner's permission, take whatever additional subsurface explorations deemed necessary at no expense to the Owner.
   2. Boring logs are included in Section 01900. Boring locations are shown on Site Plan. Jar soil samples may be examined upon written request to the Architect.

B. Visit the site to review all details of the work and working conditions and to verify dimensions in the field including headroom and interferences from adjacent structures. Notify the Architect in writing of any discrepancy before performing any work.

C. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide support and protection during earthwork operations in accordance with the requirements of authorities having jurisdiction over same.

   1. Consult official records of existing utilities, both surface and subsurface, and their connection to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work.
   2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions.

Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

D. Use of Explosives: Use of explosives is not permitted.

E. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

1. Operate warning lights as recommended by authorities having jurisdiction.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1.7 FIELD MEASUREMENTS:

A. Verify that survey benchmark and intended elevations for the work are as indicated.

1.8 PROTECTION:

A. Protect excavations to prevent cave-in or loose soil from falling into excavation. Observe OSHA standards for trenching and excavation.

B. Protect bottom of excavations and soil adjacent to and beneath foundations from freezing. Do not place fill over frozen soil.

C. Protect finished work under provisions of Section 01500.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS:

A. Ordinary Fill: Friable soil; free of rubbish, ice, snow, tree stumps, roots, and organic matter; no stone greater than one-third loose lift thickness.

B. Granular Fill: Inorganic soil free of clay, loam, ice and snow, roots, sod, rubbish, and other deleterious or organic material; graded within the following limits:

Sieve Size	Percent Finer by Weight	
	[Type 1] Granular Fill	[Type 2] Granular Fill
1/3 Loose Lift Thickness*	100	100
No. 10	30-95	30-95
No. 40	10-70	10-70
No. 200	0-15	0-8

* 8-inch maximum

C. Sand-Gravel: Hard, durable sand and gravel; free of ice, snow, clay, shale, roots, sod, rubbish, and other deleterious or organic matter; graded within the following limits:

Sieve Size	Percent Finer by Weight	
	[Type 1] Sand-Gravel	[Type 2] Sand-Gravel
*	100	100
1/2 Inch	50-85	50-85
No. 4	40-75	40-75
No. 10	-	30-60
No. 40	10-35	10-35
No. 100	-	5-20**
No. 200	0-8	2-8

* 1-1/2 inches where base course below slab on pavement; elsewhere one-third of loose lift thickness.

** Amount passing the No. 100 sieve between 40% and 70% of amount passing the No. 40 sieve.

D. Crushed Stone: Durable crushed rock or crushed gravel stone; free of ice, snow, sand, silt, clay, loam, shale, or other deleterious matter; graded within the following limits:

Sieve Size	Percent Finer by Weight	
	3/4 Inch Stone	1-1/4 Inch Stone

1-1/2 Inch	-	100
1-1/4 Inch	-	85-100
1 Inch	100	-
3/4 Inch	90-100	10-40
1/2 Inch	10-50	0-8
3/8 Inch	0-20	-
No. 4	0-5	-

E. Sand: Free of silt, clay, load, friable or soluble materials, and organic matter.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION:

A. Identify required lines, levels, contours, and datum.

B. Notify Architect in writing of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

C. Identify and flag known utility locations.

D. Notify utility company to remove and relocate utilities.

E. Maintain and protect existing utilities remaining which pass through work area.

F. Brace foundation or basement walls to support surcharge forces imposed by backfilling operations.

G. Verify fill materials to be reused are acceptable.

H. Verify foundation dampproofing has been properly installed and inspected.

3.2 PROTECTION OF ADJACENT WORK:

A. Protect all adjacent structures which may be damaged by excavation work, including service utilities and pipe chases. All construction induced damage shall be repaired by the Contractor at no additional expense to the Owner.

B. Grade excavation top perimeter to prevent surface water run-off into excavation or to adjacent properties.

3.3 DEWATERING:

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations.

B. Dewater to maintain water at least 1 foot below bottom of all excavations.

3.4 EXCAVATION:

A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

1. Excavation includes excavation of obstructions, underground structures, utilities, and other items indicated to be demolished and removed.

B. Protect all subgrade soils. Excavate disturbed subgrade and backfill in accordance with specifications at Contractor's expense.

C. Excavate soil and all other materials required to accommodate building foundations, slabs, paving and site structures, construction operations and site utilities.

D. Do not excavate to full depth when freezing temperatures may be expected unless subgrade is protected from freezing or footings or slabs can be placed immediately after excavation is completed and are protected from freezing.

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

E. Maintain safe and stable banks.

F. Correct unauthorized excavations at no additional cost to the Owner.

3.5 STABILITY OF EXCAVATIONS:

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Coordinate with work of Section 02160 for location and installation of excavation support systems.

C. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3.6 TRENCHES:

A. Excavate for all utilities and related piping to municipal utilities.

B. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit.

1. Cut trenches sufficiently wide to enable installation and inspection of utilities. Slope or shore trenches in accordance with OSHA standards.

C. Hand trim excavation and leave free of loose matter.

D. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil unless other bedding is indicated.

1. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe. Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensure continuous bearing of pipe barrel on bearing surface.

E. Support pipe and conduit during placement and compaction of bedding fill.

F. Backfill trenches to required contours and elevations, hand tamping the first 24 inches of cover over the pipe in 6 inch lifts.

1. Place and compact fill materials as for backfilling.
2. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.
3. Concrete is specified in Division 3.
4. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Architect. Use care in backfilling to avoid damage or displacement of pipe systems.

G. Provide 4-inch-thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing of piping or conduit, provide minimum 4-inch-thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.

3.7 BACKFILLING:

A. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing and perimeter insulation.
2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.
3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials.
5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

B. Prior to backfilling proofroll the exposed natural ground above the water table with; two (2) passes of approved compaction equipment; or compact the surface with ten (10) passes of a vibratory drum roller weighing at least ten-thousand pounds (10,000 lbs) at the drum; or beneath bottoms of foundations compact surface soil with at least two (2) passes of approved, powered, manually operated equipment.

C. Fill overexcavated areas under structure bearing surfaces in accordance with specifications at Contractor's expense.

D. After approval of subgrade by the Architect, backfill areas to contours and elevations with specified materials.

E. Systematically backfill. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

F. Place and compact materials to the specified density in continuous horizontal layers not exceeding loose lift thicknesses and at least the minimum number of passes in Table 02210-1. In confined areas place six-inch (6") loose lifts and compact with at least four (4) passes of approved manually operated powered vibratory plate or drum compactor.

G. Grade and compact fill surface to readily shed water.

1. Make grade changes gradual. Blend slope into level areas.
2. Where horizontal layers meet a naturally rising slope, key layer into slope by benching into the slope.

H. Employ placement method that does not disturb or damage foundation dampproofing and/or utilities.

I. Maintain range of optimum moisture content of backfill materials to attain required compaction density. If wet fill cannot be adequately compacted, remove and replace with drier fill.

J. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

K. Recompact fills subjected to vehicular traffic or other disturbances.

L. Backfill against supported foundation walls. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

M. Remove surplus materials from site.

   1. At completion of Work, leave fill material stockpile areas completely free of excess fill materials.

3.8 STORAGE OF EXCAVATED MATERIALS:

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.

   1. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.9 SOIL MATERIAL AND COMPACTION SCHEDULE:

A. All percent compactions are referenced to the maximum dry density of the soil as determined in accordance with ASTM D1557, Method C:

B. Interior Structural Slab:

   1. Granular fill to base course subgrade, each lift at or below foundation elevation compacted to at least ninety-two percent (92%) and each lift above foundation elevations compacted to at least ninety-two percent (92%).
   2. Cover with Sand-Gravel Fill base course, 6 inches thick, compacted to at least ninety-five percent (95%).

C. Beneath Foundations:

1. Where placed on saturated subgrade, Sand-Gravel Fill, twelve inches (12") inches thick, compacted to at least ninety-five percent (95%).
2. Where placed in the dry, Granular Fill, 12 inches thick, compacted to at least ninety-five percent (95%).

D. Exterior side of foundation walls and over Granular Fill: Ordinary Fill to subgrade elevation, each lift compacted to at least ninety percent (90%).

E. Fill Under Landscaped Areas: Ordinary Fill to twelve inches (12") below finish grade, compacted to at least eighty-five percent (85%) to three feet (3') below finish grade and compacted to at least ninety percent (90%) from three feet (3') to one foot (1') below finish grade.

F. Fill Under Asphalt Paving:

1. 1" Finish Course; 1-1/4" Binder Course.
2. Type I Sand-Gravel Fill 4 inches below Binder Course, compacted to at least ninety-five percent (95%).
3. Type II Sand-Gravel to 12 inches below Binder Course, compacted to at least ninety-five percent (95%).

G. Fill in trenches: Meet material and compaction as specified above for appropriate locations.

H. Fill to Correct Overexcavation: Lean concrete to minimum compressive strength of one thousand (1,000) psi] or Sand-Gravel Fill, flush to required elevation, each lift compacted to at least 92 percent.

3.10 GRADING TOLERANCES:

A. General: Uniformly grade areas within limits of grading under this section. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Top Surface of Exposed Subgrade: Plus or minus one inch (1").

C. Top of Topsoil: Plus or minus one-half inch (1/2").

D. Top Surface of Backfill Under paved areas: Plus or minus one inch (1") from required elevations.

3.11 FIELD QUALITY CONTROL:

A. Provide for observation of bottom of excavation and of bearing surfaces.

B. Test and analysis of fill materials will be performed by Owner's testing agency in accordance with ASTM C146, ASTM D1557, and with Section 01400.

C. In-place compaction testing will be performed in accordance with ASTM D1556 or ASTM D2922 and with Section 01400.

D. If test indicates Work does not meet specified requirements, remove Work (or recompact where appropriate), replace and retest at no cost to owner.

E. Frequency of Tests:

   1. At least one field density test of subgrade will be performed every 2000 square feet of paved area or building slab.
   2. For each lift of compacted fill, at least one field density test will be performed every 2000 suare feet of paved area or building slab.

3.12 MAINTENANCE:

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Settling: Where settling is observable at excavated areas during general project warranty period, remove surface, add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.13 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's property.

TABLE 02210-1

Compaction Method	Maximum Stone Size*	Maximum Loose Lift Thickness		Minimum Number of Passes	
		Below Struc. and Pave.	Less Critical Area	Below Struc. and Pave.	Less Critical Area
GRANULAR FILL: SAND-GRAVEL					
Hand-operated vibratory plate or light roller in confined areas	4"	6"	8"	4	4
Hand-operated vibratory drum rollers weighing at least 1,000# in confined areas	6"	10"	12"	4	4
Loaded 10-wheel truck or D-8 Crawler	6"	10"	12"	4	2
Light vibratory drum roller Minimum weight at drum 3,000# Minimum dynamic force 10,000#	8"	12"	18"	4	4
Medium vibratory drum roller Minimum weight at drum 10,000# Minimum dynamic force 20,000#	8"	18"	24"	6	6

* And no more than two-thirds (2/3) loose lift thickness.

END OF SECTION 02200

SECTION 02220

HANDLING AND DISPOSAL OF CONTAMINATED MATERIALS

BRA Parcel B, Washington Street, Boston, Massachusetts

PART 1 - GENERAL

1.01 DESCRIPTION

a. This Section applies to all aspects of the work related to the handling and disposal of soils contaminated with hazardous materials or oil [(as defined in 310 CMR 40.00 Massachusetts Contingency Plan (MCP)] encountered during the course of excavation and dewatering. All work under this Section shall comply with the Massachusetts Department of Environmental Protection (DEP) Policy No. WSC-400-89 "Management Procedures for Excavated Soils Contaminated with Virgin Petroleum Oils," and all applicable local, state, and federal regulations. Work under this section should also comply with the guidelines presented in "Construction Activities in Contaminated Areas" by John J. Fitzgerald, MA DEP (March 31, 1992).

b. This Section was prepared by GZA GeoEnvironmental, Inc. (GZA), under contract to L.K. Cheng Associates, Inc. (Cheng).

c. Concentrations of petroleum hydrocarbons, polycyclic aromatic hydrocarbons, and metals have been detected in soil samples obtained from the site. Results of chemical analyses are summarized in a report prepared by GZA for the Asian Community Development Corporation (ACDC) and the Chinese Economic Development Corporation (CEDC), entitled "Phase I - Site Evaluation, ACDC and CEDC, BRA Parcels A and B, Boston, Massachusetts," April 1992.

d. Environmental work in this Section shall be performed by a qualified Environmental Consultant either employed by or under contract to the Contractor.

1.02 SCOPE OF WORK

a. The work includes, but is not limited to providing all labor, materials, and equipment to:

   i. Excavate, evaluate, handle, transport, dispose of, and recycle contaminated material which may be encountered during the course of excavation.

1.03 QUALITY CONTROL

a. Laboratory chemical analyses for evaluation of excavated material shall be in accordance with the latest versions of the following specifications and references unless modified herein:

Characteristic/Compound	Procedure
Volatile Organic Compounds (VOCs)	EPA Method 8240
Toxicity Characteristic Leaching Procedure (TCLP)	40 CFR 261.24
PCB/Pesticide Analysis	EPA Method 8080
Total Lead, Arsenic, Cadmium, Chromium, Mercury, Selenium and Silver (Metals)	EPA Methods 3050 and 6010 or 7420, 7060, 7130, 7190, 7471, 7740 and 7760
Polycyclic Aromatic Hydrocarbons (PAHs)	EPA Method 8270
Total Petroleum Hydrocarbons (TPH)	EPA Method 418.1
Reactivity (Sulfide/Cyanide)	40 CFR 261.23
pH	EPA Method 9045
Flashpoint	ASTM D-93
Total Petroleum Hydrocarbons Fingerprinting (Fingerprinting)	Modified ASTM Method D3328

b. The detection limits for all chemical tests shall be low enough to allow material classification according to the criteria specified in Articles 1.06b, and shall be acceptable to the disposal or recycling facility operator.

1.04 SUBMITTALS

a. At least four (4) weeks prior to the start of any excavation or soil removal activity, the Contractor shall submit, in writing, the following for review and shall not start excavation activity until the entire submittal is approved by ACDC or a designee of ACDC.

   i. Identification of a qualified Environmental Consultant to oversee field screening and sampling of excavated material by the Contractor. Identification of a laboratory approved by the Department of Environmental Protection (DEP) to perform chemical analyses.

      Submission of certifications, qualifications, and experience of both the Environmental Consultant and laboratory. The Environmental Consultant shall have experience with environmental engineering issues similar to those on this Project. The Environmental Consultant shall demonstrate familiarity with applicable federal, state, and local regulations regarding oil contaminated soil and hazardous materials on the basis of experience with other similar projects.

   ii. Identification of potential off-site disposal and recycling facilities and the classification of material(s) to be disposed of at each location. Presentation of information substantiating the suitability of proposed sites to receive classifications of materials intended to be disposed there. This information shall include a copy of the Hazardous Waste License (as required by 310 CMR 30.800) for sites proposed to receive hazardous waste. Disposal or recycling of all excavated material must be in conformance with appropriate federal, state, and local regulations governing Hazardous Waste, Hazardous Material, and Regulated Soil. Also, identification of the hauler, equipment and handling methods to be used in disposal or recycling.

   iii. Description of methods of excavating and stockpiling excavated material, including drainage, as specified in this Section and methods to keep materials from various sources separated during processing operations.

   iv. Identification, via a Worker Health and Safety Plan, of a course of action to be taken when suspected contaminated materials are encountered in excavations. This Plan shall be submitted as a separate submittal.

   v. A quality control program developed by the Contractor and submitted for review to ACDC.

b. The Contractor shall submit to ACDC or its designee two (2) copies of results of all field and laboratory tests within one (1) week of the reporting date from the approved laboratory.

c. The Contractor shall submit to both ACDC, or its designee, and the Contractor's employees copies of written notice(s) describing the hygiene practices outlined in the Worker Health and Safety Plan.

1.05 RESPONSIBILITY OF THE CONTRACTOR

a. Minimum precautions noted in this Section shall in no way relieve the Contractor's responsibility of implementing stricter health and safety precautions as warranted by the work.

b. The Contractor shall be responsible for adhering to regulations, specifications, and recognized standard practices related to contaminated material excavated during excavation and removal activities. ACDC shall not be responsible at any time for the Contractor's violation of pertinent state or federal regulations or endangerment of laborers and others.

1.06 MANAGEMENT OF EXCAVATED SOIL MATERIAL

a. Description

   i. No excavated material will be removed for off-site disposal or recycling until the results of chemical analyses have been received by ACDC and the materials have been properly classified. The Contractor shall submit to ACDC results of chemical analyses within five (5) days after their completion, accompanied by the classification of the material and the intended disposition of the material. ACDC will review the submittal and respond to the Contractor within two (2) weeks. If the proposed disposition of the material is for reuse within the project, the Contractor shall cooperate with ACDC to obtain a suitable representative sample of the material for gradation and compaction testing.

   ii. Disposal or recycling of all material from excavation activities must be in conformance with applicable federal, state, and local regulations governing hazardous waste and contaminated material. Disposal or recycling facilities which are under active or pending enforcement action by the DEP, U.S. EPA, or other responsible regulatory agency will not be considered acceptable.

iii. All excavated materials, except for natural clay deposits, shall be screened using a 10.2 eV Photoionization Detector (PID) or equivalent, given a designation for purposes of temporary management, stockpiled, tested for the presence of oil or hazardous substances, and given a designation for purposes of on-site reuse, disposal or recycling. These designations are defined as:

(1) Hazardous Waste: Consists of materials which must be disposed of at a facility permitted and operated in full compliance with Federal Regulation 40 CFR 260-265 and Massachusetts Regulation 310 CMR 30.00, or the equivalent regulations of other states. All excavated materials classified as Hazardous Waste shall be disposed of out-of-state.

(2) Hazardous Material: Consists of material which is not classified as hazardous waste, but which contains sufficient contamination that it must be disposed of or recycled off site in accordance with the Virgin Petroleum Product Policy No. WSC-400-89, and policies and regulations of regulatory agencies in other states if applicable. A proposed recycling facility shall have a DEP Class A recycling permit. Material taken to the facility shall meet the requirements of the permit and DEP Policy No. WSC-400-89. Material not acceptable to the recycling facility, shall be disposed in accordance with the policies and regulations of the receiving state. The Contractor shall submit the identification of the proposed disposal or recycling facility for ACDC's review.

(3) Regulated Soil: Consists of material which can be disposed of at a sanitary landfill, within the Commonwealth of Massachusetts, and approved by the DEP for accepting such material; or at a similar out-of-state facility. These materials may also be reused or recycled on site or at a DEP approved recycling facility, subject to acceptance by the facility.

The preferred management alternative for this material is use as daily cover material at a lined landfill, if acceptable to the landfill operator. The Contractor shall submit the identification of the proposed disposal or recycling facility for review by ACDC. Minimum criteria for acceptable facilities for regulated soil are:

(a) Material shall not be disposed in a location which is considered a hazardous material or hazardous waste transfer, storage, or disposal facility.

(b) Materials shall not be disposed at sites which are actively considered by the DEP, U.S. EPA, or other responsible agency as potential or confirmed hazardous waste sites.

(c) Excavated materials shall only be disposed of in locations approved by the DEP.

(d) A proposed disposal or recycling facility shall provide written certification or information substantiating the suitability of the site to receive and dispose of material meeting the criteria for classification as Regulated Soil.

(e) A proposed recycling facility shall have a DEP Class A recycling permit. Material taken to the facility shall meet the requirements of the permit and DEP Policy No. WSC-400-89.

(4) Unregulated Soil: Consists of material which may be used as fill within the Commonwealth of Massachusetts, in a restricted manner. Material classified as Unregulated Soil and meeting geotechnical specifications may be used by the Contractor in areas within the project limits, subject to the approval of ACDC. Unregulated Soil not used on site shall be disposed of off site at a location suitable to the DEP. The Contractor shall submit to ACDC the proposed disposal location(s) and written authorization from the disposal area Owner/Operator for review. Minimum criteria for Unregulated Soil disposal sites are:

(a) Unregulated Soil shall be disposed of at sites within non-residential, non-sensitive urban areas or at suitable landfills. Preferred off-site disposal areas include industrial settings in areas which will be capped or covered with pavement or loam and seeded. The material may be disposed of at landfills pending written local and state approvals. The soils shall not be disposed of directly adjacent to wetlands, streams, or ponds, and will be placed above the seasonal high water table elevation.

(b) Unregulated Soil shall not be disposed in a location which is considered a hazardous material or hazardous waste transfer, storage or disposal facility.

(c) Unregulated Soil shall not be disposed at sites which are actively considered by the DEP or U.S. EPA as potential or confirmed hazardous waste sites.

iv. The Contractor shall be responsible for coordination of disposal or recycling of the excavated material. Material designated for off-site disposal or recycling shall be disposed/recycled at off-site locations appropriate for the material classification in accordance with the laws of the appropriate local, state and federal authorities.

v. The Contractor shall submit the name, location, and classification of proposed disposal or recycling facilities, along with the name and registration number of the licensed hauler to ACDC for review prior to removing excavated material off site. ACDC shall provide written notice to the Contractor of the suitability of the disposal or recycling facility within two (2) weeks of the submittal by the Contractor. THE CONTRACTOR SHALL NOT REMOVE STOCKPILED MATERIAL OFF SITE WITHOUT WRITTEN AUTHORIZATION OF ACDC. The Contractor shall be responsible for coordination with DEP for review of proposed disposal or recycling facilities.

vi. ACDC will obtain an EPA generator number, if required, and ACDC will sign all disposal manifests or DEP bills of lading.

vii. The Contractor, or subcontractor(s) retained by the Contractor to transport contaminated material off site, shall be licensed to transport Regulated Soil, Hazardous Material, or Hazardous Waste off site to a suitable waste disposal or recycling facility or facilities.

viii. All Regulated Soils, Hazardous Material, or Hazardous Waste transported off site shall be loaded by the Contractor into properly licensed and permitted vehicles and transported directly to the selected disposal or recycling facility. As a minimum, trucks shall be lined and covered with a minimum six (6)-ml thick polyethylene liner, which shall be placed to form a continuous waterproof tarpaulin to protect the load from wind and rain.

ix. Individual payment items are herein established for the disposal or recycling of excavated Hazardous Waste, Hazardous Material and Regulated Soil.

b. Contaminated Material Evaluation and Management Program

i. The following program has been developed as a minimum basis for evaluating and managing excavated materials with respect to possible contamination and their subsequent disposition. This program should be considered as a guideline and additional testing may be performed during the course of the Work if conditions warrant or if the facility at which the contaminated soils are to be disposed of or recycled require additional testing.

ii. The levels and nature of contamination may vary depending on location and/or depth. Excavation and material handling shall be performed in a manner which limits mixing materials with different levels and types of contamination. Disposal of material which is contaminated as a result of the Contractor's careless or unauthorized procedures for excavation or material handling and stockpiling shall be at the Contractor's own expense.

iii. Sampling and Analyses

(1) For the initial step in the classification process, one (1) sample per fifty cubic yards (50 cu. yd.) of excavated material will be headspace screened with a photoionization detector (PID).

For the intermediate step in the classification process, the following sampling frequencies will be performed for the respective stockpile categories:

- Stockpile Type A

  (PID Readings <1 ppm): One (1) sample per fifty to one hundred cubic yards (50 to 100 cu. yd.) of excavated or stockpiled material shall be tested for TPH; one (1) sample per one hundred to five hundred cubic yards (100 to 500 cu. yd.) for VOCs; one (1) sample per five hundred cubic yards (500 cu. yd.) for reactivity (sulfide/cyanide), pH, flashpoint, metals, PAHs, and PCB/pesticide analysis shall be tested.

- Stockpile Types B and C

  (PID Readings >1 ppm and >10 ppm, respectively): One (1) sample per 50 cu. yd. of excavated or stockpiled material shall be tested for TPH; one (1) sample per 100 cu. yd. for VOCs; one (1) sample per 500 cu. yd. for reactivity (sulfide/cyanide), pH, flashpoint, metals, PAHs, and PCB/pesticide analysis shall be tested.

Suitable representative samples of all contaminated stockpiled materials shall be submitted by the Contractor to an approved laboratory, certified by the DEP for the suite of chemical analyses listed below. All analyses conducted in accordance with the sampling frequency described above will be paid for at the unit price bid for each type of analysis. Any additional testing not specifically required by ACDC will be considered incidental to the work and not reimbursed at the unit price.

(2) Any chemical or physical analyses required by the disposal or recycling facility in addition to those specified herein, shall be obtained by and at the expense of the Contractor, the cost of which shall be included in the bid price for disposal or recycling of the appropriate classifications of materials.

(3) The Contractor may be required to submit duplicate representative samples to ACDC, as requested, and at no additional cost, for up to twenty-five percent (25%) of the samples developed from the separate sources and stockpiles for ACDC's use in securing duplicate analyses for quality control. Analyses of these samples will be performed at no cost to the Contractor. In addition, ACDC may provide the Contractor with samples for analysis; payment for these analyses will be made at the unit prices bid per type of analysis.

(4) The Contractor shall maintain records of all procedures, sampling points, and divisions of the stockpiles. Sampling and QA/QC/Chain-of-Custody record procedures acceptable to ACDC, DEP and the EPA must be adhered to.

(5) No excavated material will be removed for off-site disposal or recycling until the results of chemical analyses have been received and the materials have been properly classified by the Environmental Consultant in accordance with Article 1.06.b.v. The time required between sampling and classification of soils by chemical criteria may be up to four (4) to six (6) weeks depending on the turnaround time achieved by the Contractor's testing laboratory.

(6) The detection limits for all chemical tests shall be low enough to allow material classification according to the criteria specified with a statistical significance at a ninety percent (90%) confidence level and acceptable to the disposal or recycling facility operator.

(7) The cost of sampling and maintaining records shall be included in the prices bid for other items.

iv. Reuse of Excavated Soils

(1) It is not anticipated that excavated soils will be suitable for reuse on site because of geotechnical requirements. However, excavated materials meeting the criteria for Regulated Soil or Unregulated Soil as defined in Article 1.06b, and meeting geotechnical requirements as determined by ACDC, shall be incorporated in the Work as much as possible.

v. Classification of Excavated Materials

Evaluation of excavated materials stockpiled shall be performed by the Environmental Consultant and shall follow three (3) stages of testing and segregation - Initial Classification, Intermediate Classification, and Final Testing, as described herein.

(1) Initial Classification

(a) Initial classification will be performed as soil is excavated. For all excavated materials, classification will be based on visual and olfactory evaluation for odors, oils, grease and discoloration in addition to headspace screening with a PID calibrated to benzene using a 10.2 eV lamp, or equivalent (Headspace Screening to be Conducted in Accordance with DEP Policy No. WSC-400-89). The Contractor will provide a heated and dry shelter in the vicinity of the excavation area for the headspace screening. The soil samples shall be warmed to room temperature [sixty to eighty degrees Fahrenheit (60°F-80°F)] prior to headspace screening. Visual, olfactory, and PID screening will be considered incidental to the excavation of the material to be screened and shall not be separately measured for payment nor will separate payment be made.

(b) Headspace screening will be performed at a minimum of one (1) per fifty cubic yards (50 cu. yds.) of excavated material representative of the total volume under evaluation. In addition, when possible, the material will be inspected for visual and olfactory indications of contamination prior to excavation.

(c) The Contractor will be responsible for segregating soil into stockpiles for Intermediate Classification and Final Testing.

(d) Initial Classification criteria are:

Evaluation Method	Passing Criteria
Stockpile Type A):	
Visual and Olfactory	Should be free of cinders/ash, oil and/or grease and not exhibit unnatural odor and/or color.
	and
Headspace Screening	PID reading less than one (1) ppm above background levels
Stockpile Type B):	
Visual and Olfactory	May contain minor amounts of cinders/ash, oil and/or grease, and exhibit minor unnatural odors and/or color
and/or	
Headspace Screening	PID reading between one (1) and ten (10) ppm above background levels
Stockpile Type C):	
Visual and Olfactory	Contains cinder/ash, oil and/or grease, or exhibits unnatural odors or discoloration indicative of gross contamination
and/or	
Headspace Screening	PID reading greater than ten (10) ppm above background levels

(2) Intermediate Classification

(a) All excavated materials stockpiled in Initial Classification shall be subject to the following analyses at the sampling frequencies previously specified:

- Volatile Organic Compounds (EPA Method 8240)
- PCB/Pesticide Analysis (EPA Method 8080)
- Total Lead, Arsenic, Chromium, Mercury, Cadmium, Selenium and Silver (Metals)
- PAHs (EPA Method 8270)
- TPH (EPA Method 418.1)
- Reactivity (Sulfide/Cyanide), pH, and Flashpoint

(b) Materials with analytical test results that exceed the maximum allowable concentration for this evaluation (as indicated in Table 1) will be tested by the toxicity characteristic leaching procedure (TCLP) as part of Final Classification.

TABLE 1

INTERMEDIATE CLASSIFICATION: THRESHOLD VALUES

Compound	Maximum Allowable Concentrations (ppm)
Vinyl Chloride	4
1,1-Dichloroethylene	14
1,2-Dichloroethane	10
Trichloroethylene	10
Benzene	10
Tetrachloroethylene	14
Carbon Tetrachloride	10
Chlorobenzene	2,000
1,4-Dichlorobenzene	150
Arsenic	100
Cadmium	20
Chromium	100
Lead	500
Mercury	4
Selenium	20
Silver	100

Samples that fail any of the criteria in Table 1 shall be subjected to TCLP testing (Final Classification). Samples that do not exceed any of maximum allowable concentrations indicated in Table 1 shall not be subject to TCLP testing during the intermediate classification stage, but may be subject to further testing during final classification.

(c) Material with TCLP test results that exceed the maximum allowable TCLP concentration (as indicated in Table 2) shall be managed as a Hazardous Waste.

TABLE 2

TCLP TESTING: THRESHOLD VALUES

Compound	Maximum Allowable TCLP Concentration (mg/l)
Vinyl Chloride	0.2
1,1-Dichloroethylene	0.7
1,2-Dichloroethane	0.5
Trichloroethylene	0.5
Benzene	0.5
Tetrachloroethylene	0.7
Carbon Tetrachloride	0.5
Chlorobenzene	100
1,4-Dichlorobenzene	7.5
Arsenic	5
Cadmium	1
Chromium	5
Lead	5
Mercury	0.2
Selenium	1
Silver	5

(3) Final Classification

(a) Excavated material with analytical test results which: (1) do not exceed any of the maximum allowable concentrations established in the Intermediate Classification; or (2) if subjected to TCLP testing do not exceed any of the maximum allowable TCLP concentrations; shall be subject to the Final Classification and disposition in accordance with Table 3.

TABLE 3

FINAL CLASSIFICATION: THRESHOLD VALUES

	Final Classification Criteria (ppm)		
Constituent	Hazardous Material	Regulated Soil	Unregulated Soil
Arsenic	>40	<40	<40
Cadmium	>5	<5	<5
Mercury	>2	<2	<2
Total PAHs	>100	<100	<10
Total Non-Petroleum VOCs	>4	<4	ND
TPH	>3,000	≤3,000, >100	<100
Total PCBs	>10	≤10, >ND	ND
Flashpoint	<140° F	>140° F	>140° F
pH	>12 or <2	<12; >2	<12; >2
Reactivity			
Sulfide	>500 mg H_2S/Kg	<500 mg H_2S/Kg	<500 mg H_2S/Kg
Cyanide	≥250 mg HCN/Kg	<250 mgHCN/Kg	<250 mgHCN/Kg

Note: ND = Not Detected

For Final Classification:

- Material that exceeds any of the criteria for a hazardous material shall be managed as a Hazardous Material or Hazardous Waste.
- Material destined for off-site disposal may be required to undergo further analytical testing as specified by the disposal facility.
- Material managed as Unregulated Soil must meet all the Final Classification criteria for Unregulated Soil.

b. Stockpile Criteria

i. At least one (1) week prior to the commencement of excavation, areas approved by ACDC shall be cleared and prepared to receive the stockpiling of material.

ii. Separate stockpiles shall be provided and maintained as approved by ACDC. The Contractor shall be prepared to separately stockpile all excavated material for classification. Material classified as Unregulated Soil, Regulated Soil, Hazardous Material or Hazardous Waste shall also be stockpiled separately. Stockpiles shall be subdivided to segregate materials from different areas, and which appear to contain different contaminants and/or classifications, as designated in the paragraphs of this Section.

iii. Minimum Stockpile criteria are as follows:

  (1) Stockpile areas shall be graded such that stormwater runoff is diverted from stockpiled materials, and hay bale berms shall be placed around the perimeter of the area. Stockpile slopes shall be no steeper than 2 horizontal to 1 vertical.

  (2) The area shall be blocked off to minimize the contact of workmen and passers-by with stockpiled materials. The area shall be visibly marked with appropriate signs warning of potential hazards.

  (3) The first lift of stockpiled materials shall be placed on a minimum of two (2) layers of six (6)-mil-thick polyethylene barrier over existing soil, slab, or pavement.

  (4) Stockpiled materials shall be placed within the designated stockpile areas, graded to shed water, and covered prior to inclement weather and at the end of each work day with a minimum six (6)-mil-thick black polyethylene cover overlapped and weighted to form a continuous waterproof barrier over the material. The cover shall be maintained throughout the stockpile period to prevent water from entering the stockpiled materials and to prevent dust generation.

iv. The transfer of materials from the excavation to the stockpile areas shall be conducted in such a manner as to prevent the spread of contaminated or potentially contaminated materials across the site. Excavation, material handling, and stockpiling shall be performed in a manner which limits the mixing of materials with different levels and types of contamination to the highest degree possible. Disposal of material which is contaminated as a result of the Contractor's careless or unauthorized procedures for excavation, material handling and/or stockpiling shall be at his own expense.

v. Maintenance of the stockpiles shall be the responsibility of the Contractor.

vi. At least three (3) days prior to excavating materials for transfer to the stockpile area or to be incorporated in the Work, ACDC shall be notified in writing of the intended operation. ACDC will observe the excavation and segregation of materials. No excavation will occur without the presence of ACDC's representative or ACDC. No material shall be removed from the site without suitable segregation, stockpiling, sampling, testing, and classification.

vii. ACDC shall be notified in writing at least three (3) days prior to the rehandling of materials which have been classified as Hazardous Material or Hazardous Waste. No rehandling of these stockpiled materials shall occur without the presence of ACDC or authorized representative of ACDC.

viii. The clearing and preparing of stockpile areas and the grading, polyethylene barriers, hay bale berms, and all other materials, equipment, and labor required for protection of the excavated material will be considered incidental to the excavation of the material and will not be separately measured for payment nor will separate payment be made.

1.07 PROJECT CONDITIONS

a. Visit the site to review all details of the work and working conditions and to verify dimensions in the field including headroom and interferences from adjacent structures. Notify ACDC in writing of any discrepancy before performing any work.

b. Consult official records of existing utilities, both surface and subsurface, and their connection to be fully informed on all existing conditions to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work.

c. Project existing utilities to remain within the work area in accordance with the requirements of authorities having jurisdiction over same.

PART 2 - PRODUCTS

2.01 GENERAL

a. All materials and equipment shall be of appropriate type as outlined in the Specifications and maintained in proper operating conditions.

b. The polyethylene barrier for use in protecting stockpiles from spreading contamination or for protecting truck bodies shall be minimum 6-mil (0.006 inches) thick. At least two (2) layers of polyethylene shall be used beneath stockpiles to protect the ground surface.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

a. The Contractor shall retain a qualified professional Environmental Consultant to perform field screening and sampling of excavated material and to provide documentation of "representative sampling" to the disposal or recycling facility operators.

b. Material Excavated on the Site

  i. All excavated material shall be observed and screened with a photoionization detector by the Environmental Consultant in accordance with DEP Policy No. WSC-400-89 and stockpiled to allow sampling and testing of the material by the Environmental Consultant. Material classified as Unregulated Soil and meeting geotechnical requirements can be reused as backfill if practicable. The Environmental Consultant shall determine if any of the stockpiled material is contaminated, and if contamination is found, shall classify those contaminated stockpiled materials prior to their removal off site.

  ii. The Contractor shall be careful to not mix the existing fill with the natural underlying soil during excavation and stockpiling. The soil stockpile(s) shall be maintained in accordance with Article 1.06c of this Section.

  iii. Classification of the contaminated stockpiled material shall be made in accordance with Articles 1.06b and 1.06c (if necessary) of this Section.

  iv. Off-site disposal of material classified as Unregulated Soil that is surplus or unsuitable for reuse, will be considered and paid for as incidental to the Excavation item.

3.02 PROTECTION OF ADJACENT WORK

a. Protect all adjacent structures which may be damaged by excavation work, including service utilities and pipe chases. All construction induced damage shall be repaired by the Contractor at no additional expense to the Owner.

b. Grade excavation top perimeter to prevent surface water runoff from outside site into excavation, or from the site onto adjacent properties.

3.03 EXCAVATION

a. During excavation the soils will be classified by the Environmental Consultant and managed in accordance with the provisions of this Section.

b. The Contractor will be responsible for sampling and testing during excavation. Sampling frequency and techniques will be checked periodically by ACDC.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

a. The following classification of work will be measured by the ton, determined by weight slips countersigned by ACDC at the time of departure from the site or local scale facility:

   i. Disposal of Hazardous Waste
   ii. Disposal of Hazardous Material
   iii. Disposal of Regulated Soil
   iv. Disposal of Unregulated Soil

   The Contractor shall supply notarized invoices and proof-of-payment for final disposal and transportation by licensed hazardous waste haulers for all material disposed of under these classifications of work. Mobilization, excavation, handling of soil, and stockpiling will not be measured for payment but will be considered incidental to the cost of the above disposal items.

b. Laboratory Testing: Laboratory analyses shall be measured on a unit price basis per type of analysis performed in accordance with the following classifications:

   i. Testing - Volatile Organic Compounds

   ii. Testing - TCLP - Toxicity Characteristic Leaching Procedure

iii. Testing - PCB/Pesticide Analysis

iv. Testing - Total Lead, Arsenic, Cadmium, Chromium, Mercury, Selenium and Silver

v. Testing - Polycyclic Aromatic Hydrocarbons

vi. Testing - Total Petroleum Hydrocarbons

vii. Testing - Total Petroleum Hydrocarbon - Fingerprinting

4.02 PAYMENT

a. Payment for disposal of contaminated excavated material will be made at the Contract Unit Price Per Ton for:

   i. DISPOSAL OF HAZARDOUS WASTE, Payment Item No. 02.01

   ii. DISPOSAL OF HAZARDOUS MATERIAL, Payment Item No. 02.02

   iii. DISPOSAL OF REGULATED SOIL, Payment Item No. 02.03

   iv. DISPOSAL OF UNREGULATED SOIL, Payment Item 02.04

   The Contract unit prices for each of the above activities shall be full compensation for excavation and off-site disposal or off-site recycling as described in Article 1.06, including handling, stockpiling, transportation, disposal or recycling charges, travel, labor, equipment, materials, taxes, surcharges, permits, additional tests performed by the Contractor, and all costs associated with obtaining approval from the disposal facility, complete for each type of contaminated material.

b. Payment for Laboratory Tests of excavated materials will be made at the Contract Unit Price per Each Type Test for:

   i. TESTING - VOLATILE ORGANIC COMPOUNDS, Payment Item No. 02.05

   ii. TESTING - TOXICITY CHARACTERISTIC LEACHING PROCEDURE, Payment Item No. 02.06

   iii. TESTING - PCB/PESTICIDES ANALYSIS, Payment Item No. 02.07

iv. TESTING - BULK LEAD, ARSENIC, CADMIUM, CHROMIUM, MERCURY, SELENIUM AND SILVER, Payment Item No. 02.08

v. TESTING - POLYNUCLEAR AROMATIC HYDROCARBONS, Payment Item No. 02.09

vi. TESTING - PETROLEUM HYDROCARBONS, Payment Item No. 02.10

vii. Testing - TOTAL PETROLEUM HYDROCARBONS - FINGERPRINTING, Payment Item No. 02.11

The Contract unit prices shall be full compensation for field sampling and laboratory analysis including travel, labor, equipment, materials, reports, and submittals, complete, for each type test.

4.03 PAYMENT ITEMS AND UNITS OF MEASURE

Item No.		Unit of Measure
02.05	TESTING - VOLATILE ORGANIC COMPOUNDS	EA
02.07	TESTING - PCB/PESTICIDES ANALYSIS	EA
02.08	TESTING - BULK LEAD, ARSENIC, CADMIUM, CHROMIUM, MERCURY, SELENIUM AND SILVER	EA
02.10	TESTING - PETROLEUM HYDROCARBONS	EA
02.06	TESTING - TOXICITY CHARACTERISTIC LEACHING PROCEDURE	EA
02.09	TESTING - POLYNUCLEAR AROMATIC HYDROCARBONS	EA
02.11	TESTING - TOTAL PETROLEUM HYDROCARBONS - FINGERPRINTING	EA
02.01	DISPOSAL OF HAZARDOUS WASTE	TN
02.02	DISPOSAL OF HAZARDOUS MATERIAL	TN
02.03	DISPOSAL OF REGULATED SOIL	TN
02.04	DISPOSAL OF UNREGULATED SOIL (measured in truck, after excavation)	CY

* * * END OF SECTION * * *

SECTION 02350 - PILE FOUNDATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. Provide labor, materials, and equipment necessary to complete the work of this section, and without limiting the generality therefore, includes:

1. Providing complete precast, prestressed concrete piles to support a maximum design load of 95 tons.
2. Furnishing and installing all piles, including splicing, to the required bearing stratum and/or driving resistance as specified hereinafter.
3. Transporting all piles to the site including obtaining necessary permits and police details.
4. Establishing lines and grades, including layout of piles in the field.
5. Cutting off all piles at the proper grade as shown on the Drawings.
6. Coordinating and determining the proper relationship of the work to the structure and to the work of all other trades.
7. Perform High Strain Dynamic testing as specified in Part 3 and Section 02357. Testing will be performed on approximately five (5) initial piles, and up to ten (10) percent of production piles.
8. Perform static load testing as specified in Part 3 and Section 02356.
9. Adjusting installation techniques to minimize vibrations to adjacent structures and buried utilities.
10. Examine all other Sections of the Specifications for requirements which affect work of this Section, whether or not such work is specifically included in this section.

B. Related Sections: The following sections contain requirements that relate to this Section:

1. Section 02200, "Earthwork", for excavating and backfilling for piles and pile caps and grade beams bents, including controlling water.
2. High Strain Dynamic Pile Testing - Section 02357
3. Pile Load Tests - Section 02356
4. Section 03300, "Cast-in-place Concrete", for concrete materials.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Complete pile shop drawings and design calculations bearing the stamp of a Professional Engineer, registered in the Commonwealth of Massachusetts, as required to demonstrate compliance with contract documents. Drawings shall include all structural and reinforcing details and splice design. Any departures, including changes in related portions of the project and the reasons therefore, shall be submitted with the shop drawings. Approved departures shall be made at no additional cost to the Owner.

B. Pile drawings and design calculations shall be submitted to the Architect at least one (1) week prior to initiation of pile driving.

C. Submit manufacturer's data on pile-driving hammer and a drawing showing details of cap block, cushion block, and driving head assembly. If a follower is proposed, submit details including dimensions, materials, cushions, and other information. Followers may only be used if approved by the Architect.

D. Submit details of the proposed driving system at least one (1) per week prior to initial pile installation to the Architect for wave equation analyses.

E. Submit the concrete mix design and strength test data on which the mix design is based. Submit test reports prepared by an independent testing laboratory certified by the Commonwealth of Massachusetts.

F. Submit all details for production, curing, and shipping of piles, and note the date of manufacture and shipping of each pile on the project.

G. Submit weekly drawings of as-driven pile locations and final as-driven pile location plan certified by a Registered Land Surveyor or a Registered Professional Engineer.

1.4 SUBSURFACE SOIL DATA AND SITE CONDITIONS:

A. Soil Data:

1. It is the obligation of the Contractor to examine the site, to verify all dimensions in the field, and to review logs of borings, jar soil samples, records of investigations, and other pertinent data, and to employ all other means at his disposal to familiarize himself

completely with conditions existing at the site. At his own expense, the Contractor may take whatever additional borings or explorations he deems necessary.

2. Jar soil samples of borings performed in 1991 may be examined upon request to the Architect. Additional information is contained in a report prepared by GZA GeoEnvironmental, Inc., (GZA) dated August 1991, and is available from the Owner.

B. Utilities: The Contractor shall visit the premises to familiarize himself thoroughly with all details of the work and of working conditions, to verify all dimensions in the field, and to advise the Architect of any discrepancy before performing any work. The Contractor shall consult official records of existing utilities, both surface and subsurface, and their connections, and shall fully inform himself of all existing conditions and limitations as they apply to his work and of the extent and character of the work required under this section and its relation to all other construction work.

C. Utilities Left in Place: Existing utilities found on the project site which are to remain shall not be disturbed or damaged. Provisions for protection of same shall be made in accordance with the requirements of authorities having jurisdiction over same.

1.5 QUALIFICATION REQUIREMENT:

The Contractor shall submit evidence of suitable experience in this type of installation and of the competence and experience of the person in charge at the site. As a minimum, the Contractor shall provide evidence of having successfully completed at least three projects of a scope comparable to this project. Approval of the Contractor's experience shall be based solely on the judgment of the Architect.

1.6 STANDARDS:

All work performed under this Section shall conform to generally accepted engineering standards and shall be of highest quality, workmanlike construction. Furthermore, unless modified by the Contract Documents, all work shall comply with: (1) Massachusetts State Building Code, latest edition; (2) AASHTO/PCI Joint Committee Prestressed Concrete Pile Recommendations, latest edition.

1.7 LAYOUT AND RECORDS:

A. Piles shall be located and staked by the Contractor, and the Contractor shall maintain all location stakes, establish all elevations required, and be responsible for the correct locations of all piles.

B. Full-time observation and logging of all pile-installation operations will be provided by the Architect or authorized representative at no cost to the Contractor. No piles shall be driven except in the presence of the Architect or authorized representative.

C. The Contractor shall employ a licensed Registered Land Surveyor or a Registered Civil Engineer, familiar with this type of work, who shall establish lines and levels and the accurate locations of all piles after driving. The Contractor shall be responsible for correct locations of piles.

D. The Contractor shall keep a record, independent of that which may be made by the Architect, or authorized representative, of all pertinent data relative to the installation of piles. This record shall be available for the Architect's, or authorized representative's inspection, and shall be transmitted to him as he directs. This record is to include for each pile:

1. Date and time of installation.
2. Total penetration as shown by tip elevation.
3. Cutoff elevation.
4. Layout of pile locations.
5. Final as-driven location of each pile as prepared by the Contractor's Surveyor.
6. Final penetration resistance recorded as number of hammer blows per inch for final six (6) inches of driving.
7. Hammer model and energy.

PART 2 - PRODUCTS

2.1 PRECAST, PRESTRESSED CONCRETE PILES:

A. Piles: Piles shall be minimum twelve (12) square inches, precast, prestressed concrete piles, designed and manufactured in accordance with the joint AASHTO and PCI Committee recommendations, and AASHTO Standard Specifications for Highway Bridges latest revisions, to support the design load of 95 tons.

B. Splices: Under normal circumstances, no splices are permitted.

   1. Pile Buildups, if required shall be submitted for approval.

C. Concrete: Twenty-eight (28) day compressive strength shall be no less than five thousand pounds per square inch (5,000 psi). Piles shall not be delivered to the field until the concrete has obtained a strength of three thousand, five hundred pounds per square inch (3,500 psi), as verified by test cylinders, and in no case less than seventy-two (72) hours after casting.

2.2 TYPE OF PILE:

A. The foundation design is based upon a precast concrete pile of 95 ton design load. The pile shall obtain an ultimate capacity of 2.25 design load. The bid shall be based on this type of pile only.

B. Substitute Foundation Types Hereby Known as Substitutes:

   1. Substitutes may be submitted after the Contract has been awarded if given the approval of the Architect.
   2. No piles that are wood in any part will be substituted.

C. Requirements for Substitutes:

   1. All substitutes must be capable of developing required ultimate capacity.
   2. Proposal of substitutes must be accompanied by substantiating data, including but not limited to the following:

      a. Complete physical characteristics of the pile/caisson.
      b. Calculations indicating pile/caisson capacity development.
      c. Proposed installation procedure, equipment and modification to specifications.
      d. Unit cost per foot of pile/caisson which shall include: cutting, capping, and supplying and driving piles.

   3. All pertinent information for substitute piles/caissons shall be submitted to the Architect for review at least ten (10) working days prior to commencing any work.
   4. The Contractor shall bear the costs of design and review of substitute whether or not the substitute is accepted.
   5. The Architect will reject or accept proposed substitutes ten (10) days after submission of same.

PART 3 - EXECUTION

3.1 DRIVING EQUIPMENT:

A. Hammers shall be either steam, air, or diesel hammers, having a rated energy of not less than nineteen thousand (19,000) foot-pounds and a minimum ram weight of three thousand (3,000) pounds. The valve mechanism and other parts of hammers shall be maintained in a condition which will ensure that the length of stroke and number of blows per minute for which the hammer is designed will be realized. Steam and air hammers shall have boiler/air capacity which is not less than that specified by the hammer manufacturer; boiler and compressor shall have either pressure gauges or other devices calibrated in a manner which will allow hammer energy to be determined. When the determination of the final driving resistance is being made, the hammer shall be operated at a speed not less than ninety (90) percent of the maximum blows per minute or energy for which the hammer is rated by the manufacturer. Required final driving resistance, as stated in this specification, shall be adjusted to compensate for hammer speeds or energy deviating from those stated by the manufacturer.

The Contractor shall maintain the boiler or air pressure recommended by the manufacturer and shall employ hose and connections of the proposed sizes. Pile and hammer shall be held in alignment by leads and in a manner which will ensure that the centerline of the hammer is an extension of the centerline of the pile. The driving head shall fit the top of the pile and shall extend down the sides of the pile not less than four (4) inches. Diesel hammers should have a bounce pressure gauge or markings on the ram to permit measurement of actual hammer operating energy.

B. Leads of the pile-driving rig shall be fixed at two (2) points; the points shall be at least half the length of the leads apart in order to maintain the pile and hammer in axial alignment at the correct plan location during the entire driving operation. The leads shall extend down to the lowest point at which the hammer must operate.

C. Cap block cushion shall consist of multiple layers of aluminum-micarta discs, stacked in a steel housing with steel top and bottom plates. Alternative arrangements, if proposed, shall be demonstrated to be equally efficient in transmitting the energy of the hammer and in preventing damage to the top of the pile. No asbestos material shall be permitted in the cap block.

D. Cushion block between hammer and top of pile shall consist of a stack of plywood. Alternative arrangements, if proposed, shall be demonstrated to be equally efficient in transmitting the energy of the hammer and in preventing damage to the top of the pile. The use of a cushion consisting of wood chips, wood shavings, wire rope, or other materials with highly compressible properties shall not be permitted. Plywood pile cushions more than six (6) inches thick will not be permitted without the specific approval of the Architect. Cushion blocks shall be replaced at regular intervals as required by the Architect or authorized representative. Cushion blocks shall not be replaced during the final three (3) inches of driving.

E. The proposed pile-driving equipment shall be subject to the approval of the Architect or authorized representative. Approval will be granted after review of the Contractor wave equation analyses and shall be secured before pile-driving starts. The same equipment shall be used for all initial piles and production piles. Approval by the Architect or authorized representative of the Contractor's equipment shall merely signify that the Contractor may make an initial trial installation with the proposed equipment. Approval will not relieve the Contractor of his responsibility for providing and installing piles capable of supporting the design loads by whatever means necessary, including changing the equipment and procedures from those used in the initial trial.

F. The use of followers will only be permitted with the prior approval of the Architect. Driving criteria may have to be altered if a follower is used. Submit details of follower at least one week prior to proposed use.

3.2 INSTALLATION:

A. General:

1. No pile shall be driven unless witnessed by the Architect or authorized representative. Contractor shall mark off each foot of the pile, log blows per foot, and log blows per inch for the final six (6) inches, unless first take-up is abrupt at virtual refusal (less than one-half (1/2) inch penetration for ten (10) blows). Pile marking is detailed later in text.
2. Piles shall be driven through overburden soils into the underlying glacial till/bedrock bearing stratum, to the specified final driving resistance.

B. Driving Criteria:

1. Prior to the start of pile driving, the Architect shall perform wave equation analyses of his proposed pile driving system. The analysis shall show that the driving system is suitable to provide an ultimate bearing of 2.25 times the design load (95 tons) without damage to the piles, at a penetration resistance of no more than 8 blows per inch. The location of the

required ultimate bearing capacity shall be on the linear portion of the resistance versus blow count curve. The analysis shall indicate that driving stresses are below the levels specified herein.

2. The Contractor is responsible for placing piles to such depths that will safely develop the ninety-five (95) ton design load. Maximum tensile stresses and compressive stresses during driving shall be limited to the following:

   maximum compressive stress = $0.85\ f'_c$ - prestress

   maximum tensile stress = $3\sqrt{(f'_c)}$ + prestress

   where:
   f'_c = specified minimum compressive strength of concrete, psi

3. Cease driving if not less than one-half (1/2) inch penetration under ten (10) blows to limit overstressing. The engineer reserves the right to change the blow count criteria after reviewing results of pile driving analyzer tests and wave equation analyses provided by the Contractor.
4. The Contractor will be permitted the use of a hammer of a type and size which he has found to be adequate, provided that the hammer develops no less than ninety (90) percent of its rated capacity.

   a. Rated energy of hammer: at least nineteen thousand (19,000) foot-pounds.
   b. Ram weight: at least three-thousand (3,000) pounds.
   c. Restrict energy of hammer as necessary to prevent tensile failure of concrete piles under soft driving and when penetrating through the fill layer into the overlying organics stratum.

5. When the contractor stops operations for a period of time (such as for mechanical problems) before a pile is driven to the required driving resistance, the pile will be "re-started". Any pile restarted shall be driven at least three (3) inches before reaching final driving resistance unless refusal, defined as less than one-half (1/2) inch penetration for ten (10) blows, is achieved. The Architect or authorized representative reserves the right to require the Contractor to test, with the pile driving analyzer, piles which reach refusal at less than three (3) inches penetration. The Architect or authorized representative reserves the right to reject any pile which reaches refusal before achieving three (3) inches penetration based on pile driving analyzer results.

D. Pile Heave:

1. Heave checks will be made on all piles. Immediately after the pile reaches the required resistance, the Contractor shall set up a reference elevation on the pile to an accuracy of one-hundredth (0.01) of a foot. After driving all piles within thirty (30) foot radius surrounding the pile, the reference elevation shall be checked, and any pile showing more than four hundredths (0.04) of a foot heave shall be re-driven. Heave checking and re-driving will continue until the Architect or authorized representative is assured that pile heave does not occur. The Architect or authorized representative may reduce the thirty (30) foot radius zone to a smaller zone pending results of the initial heave checking.

   Where pile point heave is indicated, retapping (backdriving) of the piles will be required in sufficient pattern to establish that all piles have the required specified final resistance. Criteria for redriven piles are as follows:

   a. Drive pile a minimum of two (2) inches or a minimum of fifty (50) blows, whichever occurs first.
   b. If pile penetrates less than two (2) inches after fifty (50) blows, stop driving.
   c. Otherwise, drive pile at least to original tip elevation and thereafter to the original final driving resistance.

2. In soils in which the driving of piles causes the points of previously driven piles to heave, special consideration will be given to the sequence of pile installation.

3.3 TOLERANCES:

A. General:

1. All piles shall be located within three (3) inches of the design position in plan, except as noted below.
2. Where piles as installed exceed the specified tolerance, the Contractor shall remove the pile and install a replacement pile. In addition, the Architect shall determine locations and the need for additional corrective measures.
3. The installation of replacement piles and other corrective measures shall, in all cases, be subject to approval by the Architect and shall be performed by the Contractor at no additional cost to the Architect.
4. Whenever misalignment of piles necessitates structural redesign, the cost of such redesign shall be deducted

from sums otherwise due to the Contractor under the Contract.

5. The tops of all piles shall be cut off within one-half (1/2) inch of the elevations indicated on the Drawings.
6. Any pile damage or location tolerance excesses or excessive driving time resulting from the selection of a hammer not suited for the job will be the responsibility of the Contractor and will be corrected as the Architect directs at no additional cost to the Owner.

3.4 REJECTED PILES:

A. Obstructions:

1. Where obstructions or very dense granular layers make it impossible to install certain piles at locations shown on the Drawings and/or to the proper depths, the Contractor shall resort to all usual methods for pile installation, including spudding, jetting, and excavation. Excavating to a depth of five (5) feet below cutoff elevation and removing obstructions up to one (1) cubic yard in volume shall be considered a usual method and shall be at the Contractor's expense.

   If, in the judgment of the Architect, the Contractor is unable to complete the proper installation of any pile, by and after resorting to such methods, the Architect may order than an additional pile or piles be driven or that other remedial action be taken, for which the Contractor will be paid in accordance with the unit prices established in this contract. Any pile abandoned because of obstructions encountered before reaching the anticipated bearing depth will be cut at cutoff elevation or pulled out, and the open hole filled with lean concrete at the discretion of the Architect or authorized representative and at no additional cost to the Owner.

2. If the Architect or authorized representative determines that obstructions more than five (5) feet below cutoff elevation or greater than one (1) cubic yard in volume should be removed by excavation, the Contractor will be reimbursed for the additional work of removing obstructions and backfilling beyond that included in the "usual methods" on a "time and materials" basis. No additional payment for removal of any obstruction will be made unless approval of such work, including agreement for extra compensation for such work, has been made in writing by the Architect in advance of execution of the work.

3. Piles abandoned because of obstructions encountered shall be cut at design cutoff elevation or pulled out at the discretion of the Architect. In either case, the Contractor will be paid on the basis of the pile length driven below design cutoff elevation for those piles which cannot be driven to the required depth by the "usual methods."

B. Broken Piles:

1. At no cost to the Owner, piles which break above ground or within ten (10) feet of the ground surface shall be replaced or cut off and spliced (only as permitted in paragraph 2.01.B.2) to an intact section at the discretion of the Architect. If requested, the Contractor shall excavate to ten (10) feet below cutoff elevation to investigate suspected breaks.
2. Piles which are suspect to a potential break, based upon driving logs, but in which the break cannot be verified because of depth, may be rejected at the discretion of the Architect or authorized representative. Installation of replacement pile(s) and other corrective measures, including design changes and structural changes to the pile cap required because of a broken pile, shall be borne by the Contractor.

C. Defective Piles:

1. Defective piles will be replaced either by extracting the defective pile or by enlarging the group and driving additional piles, as the Architect may approve. Such replacement or addition shall be solely at the expense of the Contractor and without compensation.
2. A pile exhibiting any one of the following conditions will be deemed a defective pile:

    a. Piles exceeding the three (3) inch placement tolerance, unless otherwise specifically accepted by the Architect.
    b. Any pile which shows signs of being broken, spilled, or otherwise damaged during driving, including damage to the pile tip.
    c. Any pile which, through the encountering of difficulties arising from the equipment or materials used, cannot be properly installed.

3.5 OBSERVATIONS AND TESTS:

A. Observations: All work performed under this Contract shall be subject to observation and tests by the Architect or authorized representative, at no cost to the Contractor. The Contractor shall cooperate with the Architect or authorized representative and shall provide convenient access to all parts of the work for the purpose of observations to check compliance with the plans and specifications. No pile shall be driven except in the presence of the Architect or authorized representative.

B. Access: The Contractor shall provide to the Architect or authorized representative free and safe access to the work at all times.

C. Length Markings: Each pile shall be marked in readily visible markings showing length from the tip in at least one (1) foot intervals. Each five (5) foot interval shall be marked with a numeral. The pile shall be marked in one (1) inch intervals near the butt at the segment where final take-up is expected. Alternatively, provide a rule marked in inches close to each driven pile location to permit observation of final penetrations blows per inch.

1. The Contractor shall maintain an area around pile so that the rule may be placed within two-feet of pile being driven. Under no circumstances shall final driving resistance be determined from markings made on the pile hammer. Where piles are driven below the deck level, a splice shall be installed or the area around the pile excavated such that the pile penetration can be observed and the hammer does not come in contact with the deck.

D. High Strain Dynamic Pile Testing: The Contractor shall test five (5) initial piles and up to approximately ten (10) percent of production piles using a Dynamic Pile Analyzer. Testing will include both initial drives and restrikes and shall be in accordance with Section 02357. These test data will be used to verify driving stresses and allowable pile loads.

E. Static Load Testing: One (1) initial pile shall be subjected to static load testing to three (3)times design load or failure as specified in Section 02356 prior to the start of production pile driving.

F. Initial Piles:

1. Drive at least five (5) initial piles to the preliminary driving criteria of blow counts specified by results of the wave equation analyses at production pile locations. The piles shall be driven near different cap locations and spaced out as practical in order to evaluate driving experience and pile lengths at different locations. No additional piles will be driven until the results of the High Strain Dynamic Testing and static load test on the initial piles (including the restrike testing) have been assessed and the establishment of final driving criterion completed.

2. Initial piles placed in permanent locations may be incorporated into work if, after satisfactory completion of High Strain Dynamic Tests, piles are approved for inclusion in work by the Architect.
3. Initial piles shall be cast with three telltale anchor systems comprised of groutable quick disconnect bayonet type anchors as manufacture by Geokon, Inc., Lebanon, N. H.. Provide 3/8-inch steel sleeves to the pile butt. One telltale shall be located 1 foot off the bottom of the pile, the second 15 feet off the tip and the third at 30 feet above the pile tip.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

A. Mobilization: Mobilization and demobilization including all equipments and materials, pre-augering of pile locations, surveying and related services as specified herein, are included in the base contract amount.

B. Production Piles: Piles will be measured as the linear length of installed piles, accepted by the Owner or authorized representative, from tip elevation to final cutoff. Test piles (initial piles) will be measured for payment.

C. Preaugering: Although preaugering is not expected, if it was required by the Owner or authorized representative, will be measured on a per linear foot basis from final cutoff to a completed depth.

D. Obstruction: Obstruction removal by unusual methods as defined by paragraph 3.04.A.2 and only if it was performed under the direction of the Architect or authorized representative will be measured on a per cubic yard basis only. Downtime required to remove the obstructions will not be measured separately.

4.2 PAYMENT:

A. Production Piles: Each Contractor shall state, as called for on the FORM FOR GENERAL BID, a unit price per lineal foot (LF), ninety-five (95) ton design load precast, prestressed concrete piles complete, in accordance with the Drawings and these Specifications, measured between plan cutoff and inferred pile tip elevations. The unit price will include full compensation for furnishing and installing complete all piles indicated on the Plans and Specifications, excluding initial test piles.

C. Test Piles: Payment for test piles will be made at the bid unit price per foot for installed ninety-five (95) ton design load precast, prestressed concrete piles complete, in accordance with the Drawings and these Specifications, measured between plan cutoff and inferred tip elevations.

D. Preaugering: Although preaugering is not expected, if it was directed by the Owner or authorized representative, payment will be made at the bid unit price, including augering, spoil removal, and provision and mobilization of all equipment and materials required for same.

E. Obstruction: Payment for obstruction removal by unusual methods as defined by paragraph 3.04.A.2 and only if it was directed by the Owner or authorized representative, will be made at the bid unit price per cubic yard basis; including removal and disposal, backfilling, and provision and mobilization of all equipment and downtime required for same.

END OF SECTION 02350

SECTION 02356 - PILE LOAD TESTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes pile load testing with documented results, preparation of work area, and dismantling and removal of equipment and load.

B. Related Sections:

1. Section 01400, "Quality Control Services".
2. Section 02200, "Earthwork", for excavation to working and test equipment level.
3. Section 02350, "Foundation Piles".
4. Section 02357, "Dynamic Pile Testing", for dynamic testing of piles, not work of this Section.

1.3 APPLICABLE STANDARDS:

A. Comply with the following regulations and standards:

1. ASTM D1143 - Testing Piles Under Static Axial Compressive Load.
2. Massachusetts State Building Code.

1.4 QUALITY ASSURANCE:

A. Provide evidence of having successfully completed at least three (3) pile load tests of the scope and magnitude required for this project.

B. Provide evidence that the person in charge of pile load testing at the site is experienced in such testing.

C. Maintain sufficient protection and heating, if necessary, to limit wind and temperature differences which could affect readings.

1.5 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.

B. Provide detailed information and drawings on test method, type and layout of measuring equipment, reaction type and layout, protective covering, telltales safety devices, and calibration equipment. Provide space, approximately twelve inches (12"), within the load test setup for placement of a load cell and associated steel shims. Load cell will be provided by the Architect and paid for by the Owner.

C. Provide a calibration record for the hydraulic jack to be used for the test. The jack, including the complete assembly of pumps, gages, and ram to be used in the tests, shall be calibrated for this project by an approved testing laboratory. A minimum of three (3) calibration runs shall be performed at ram extensions of one inch (1"), mid-range, and one inch (1") less than full range.

D. Submit test reports under provision of Section 01400.

E. Document the test equipment and layout used, method of calibrating and recording, reference points, test results, recommendation or modification of piling method used.

1.6 UNIT PRICES:

A. Compression piles installed for load tests will be measured for payment if acceptable based on the unit price and method established for reinforced concrete piles in Section 02350.

1. Acceptance of pile load test will be based on the Contractor maintaining the required load magnitude for the required duration. Tests terminated due to failure of loading or measurement equipment supplied by the Contractor or due to Contractor's work will not be measured for payment.
2. Test terminated due to failure of the tested pile to achieve the required load due to inadequate soil bearing will be paid for, whether or not the pile itself is accepted.

B. Performance of pile load tests, including constructing and removing the test load reaction system; driving and removing temporary piles and supports; furnishing protective coverings; operating and reading jacks, gages, and related equipment; and all labor, materials, equipment, tools, and incidentals necessary for proper execution of the pile load test as specified, is included in the base Contract bid.

1. The cost of any extra cutoff and steel reinforcement installation required for load test execution shall be included in the load test price.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Provide equipment, reaction system, and load instrumentation conforming to ASTM D1143.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Verify site conditions will support cribbing and load for testing purposes.

B. Establish working elevation for test equipment.

C. Verify that the Architect has accepted the type of test equipment and layout before starting the test.

3.2 TESTING:

A. Perform load tests on piles and document test procedures and results in accordance with ASTM D1143.

1. Apply load to pile by hydraulic jack acting against a reaction frame. Reaction load shall be at least one hundred and twenty-five percent (125%) of the maximum test load.
2. Measure movements of pile butt by at least three (3) independent methods specified in ASTM D1143. One (1) method shall be by three (3) dial gages accurate to 0.001 inch. Space dial gages at one hundred and twenty degrees (120°) around the pile at equal distance from the center of the pile.
3. Use ASTM D1143 quick loading procedure. Apply load in 20 kip increments.
4. Measure movements of the top of each telltale relative to pile top with a dial gage reading to 0.001 inch.

B. Wait at least ninety-six (96) hours after pile is in place and concrete has reached required strength before loading.

C. Subject test pile to three (3) times design load or failure.

D. If tested piles do not conform to requirements, perform additional testing of other piles.

3.3 OBSERVATIONS BY THE ARCHITECT:

A. The Architect or its representative will observe and record all load-settlement or deflection data during the load tests. The Contractor shall provide personnel at the site as required during testing, to operate all equipment necessary for application and maintenance of all load increments on test piles.

B. Provide the Architect free and safe access to the work and sufficient lighting to take readings at all times.

C. The Architect or its representative will monitor reaction piles for uplift.

END OF SECTION 02356

SECTION 02357 - DYNAMIC PILE TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes all equipment, materials, labor, and incidentals necessary to perform High Strain Dynamic Pile Testing during the driving and restriking of pre-cast prestressed concrete piles. Testing shall conform to ASTM D-4945-89.

B. The Owner's representative shall perform the dynamic testing at no additional cost to the Contractor.

C. Coordinate work with that of other trades or contracts affecting or affected by work of this Section and cooperate with such trades to assure the steady progress of the work.

D. Examine all other sections of the Specifications for requirements which affect work of this Section, whether or not such work is specifically included in this section.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EQUIPMENT:

A. The Owner's representative shall provide all necessary equipment required for the performance of the dynamic testing of the piles. The Contractor shall provide support the Owner's representative during conductance of the tests. Approximately 20 minutes will be required to prepare the test piles for attachment of velocity and force transducers prior to test pile driving.

3.2 TESTING:

A. The Owner's representative shall perform High Strain Dynamic

Testing on five (5) initial piles prior to the start of production pile driving. During driving of production piles, up to ten percent (10%) of the production piles will be selected for dynamic analysis testing with a minimum of three (3) days advance notice given to the Contractor by the Engineer.

B. The Owner's representative shall fasten a pair of transducers and a pair of accelerometers in place prior to testing. The pile shall be driven and tested until an ultimate capacity of 2.25 times the design capacity has been obtained.

C. Restrike testing shall be performed after a waiting period of at least 48 hours.

E. The results of the dynamic testing shall be printed by the pile driving analyzer and shall include for each blow count selected by the Architect or authorized representative, a combination of the following quantities: bearing capacity from the Case Goble Method; input and reflection values of force and velocity; maximum transferred energy; maximum compression and tensile forces; velocity and displacement; blows per minute; value of upward and downward traveling force wave; and ram stroke and corresponding blow sequence. All of the above information shall be supplied to the Contractor within twenty-four (24) hours of the testing. All signals shall be recorded on magnetic tape or computer disc and made available upon request. A written report summarizing generated data and computed bearing capacities will be prepared by the Engineer.

F. One initial drive pile will be selected for static load testing in accordance with Section 02356.

3.3 BASIS OF PAYMENT:

A. The work of this Section is included in the base contract bid, including mobilization, demobilization, all contractor's support, labor, and incidentals necessary for attaching the transducers and accelerometers to the piles; performing the dynamic analysis in accordance with ASTM D4945-89; and performing all other work specified in this section which is not included in other sections, and all incidental work required to properly execute the work in accordance with these specifications and to the complete satisfaction of the Architect or its representative.

END OF SECTION 02357

SECTION 02511 - HOT-MIXED ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes provisions for hot-mixed asphalt paving over prepared subbase.

1. Extent of asphalt paving is limited to repairs of public streets and ways required by earthwork, site utilities work, and work of other sections.

B. Related Sections: The following sections contain requirements that relate to this Section:

1. Cutting and removing existing paving for required excavation, and installation and compaction of paving subbase is specified in Section 02200, "Earthwork"; proof rolling of prepared subbase is included in this Section.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

1.4 SITE CONDITIONS:

A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg F (10 deg C) and when temperature has not been below 35 deg F (1 deg C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 40 deg F (4 deg C) and when base is dry. Base course may be placed when air temperature is above 30 deg F (minus 1 deg C) and rising.

C. Grade Control: Establish and maintain required lines and elevations.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General: Use locally available materials and gradations that exhibit a satisfactory record of previous installations.

B. Coarse Aggregate: Sound, angular crushed stone, crushed gravel, or properly cured crushed blast furnace slag, complying with ASTM D 692-88.

C. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone, properly cured blast furnace slag, gravel, or combinations thereof, complying with ASTM D 1073.

D. Asphalt Cement: ASTM D 3381 for viscosity-graded material; ASTM D 946 for penetration-graded material.

E. Prime Coat: Cut-back asphalt type, ASTM D 2027; MC-30, MC-70 or MC-250.

F. Tack Coat: Emulsified asphalt; ASTM D 977.

2.2 ASPHALT-AGGREGATE MIXTURE:

A. Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with ASTM D 3515 and as recommended or required by City of Boston Department of Public Works standards for roadways, and to suit project conditions.

1. Base Course: Class I, Type I-1.
2. Surface Course: Class I, Type I-1.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION:

A. Proof-roll prepared subbase surface to check for unstable areas and areas requiring additional compaction.

B. Notify Contractor of unsatisfactory conditions. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

C. Prime Coat: Apply at rate of 0.20 to 0.50 gal. per sq. yd., over compacted subgrade. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile.

D. Existing Pavement: Wherever new paving abuts existing, trim loose edges and broom.

E. Tack Coat: Apply to contact surfaces of previously constructed asphalt, including new base course installed earlier, or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface.

F. Allow to dry until at proper condition to receive paving.

G. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.2 PLACING MIX:

A. General: Place hot-mixed asphalt mixture on prepared surface, spread, and strike off. Spread mixture at minimum temperature of 225 deg F (107 deg C). Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness.

1. Base Course Thickness: 4" unless otherwise indicated.

2. Surface Course Thickness: 1-1/2".

B. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.

3.3 ROLLING:

A. General: Begin rolling when mixture will bear roller weight without excessive displacement.

B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.

C. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.

D. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 95 percent laboratory density.

E. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

F. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.4 FIELD QUALITY CONTROL:

A. General: Comply with requirements of the City of Boston Department of Public Works for paving of public ways.

END OF SECTION 02511

SECTION 02515 - UNIT PAVERS AND STONE DUST SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes ungrouted mortarless concrete pavers on compacted subgrade with stone dust joints and stone dust surfacing.

B. Related Sections: The following sections contain requirements that relate to this Section:

1. Section 02200, "Earthwork", for compacted subgrade under unit pavers and surfacing.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data and manufacturer's installation recommendations for the following products:

1. Concrete pavers and setting bed materials.

C. Material test certificates for base course aggregates and stone dust materials indicating compliance with specified grading requirements.

D. Manufacturer's literature showing full range of colors, textures, and patterns available for each type of unit paver indicated.

E. Samples for verification purposes in full-size units of each type of unit paver indicated, in sets for each color, texture, and pattern specified, showing full range of variations expected in these characteristics.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced Installer who has successfully completed unit paver installations similar in material, design, and extent to that indicated for Project.

B. Single-Source Responsibility: Obtain each color, type, and variety of unit pavers, joint materials, and setting materials from a single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying progress of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Protect unit pavers, stone dust, and other aggregate during storage and construction against wetting by rain, snow, or ground water and against soilage or contamination from earth and other materials.

1.6 PROJECT CONDITIONS:

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include but are not limited to the following:

1. Licensee of Uni-Group U.S.A. that markets unit pavers in the Project location that comply with requirements.
2. Hastings Pavement Co., Inc.
3. Ideal Paving Co., Inc.

2.2 UNIT PAVERS:

A. Concrete Pavers: Solid concrete interlocking paving units, ASTM C 936, made from normal weight aggregates in sizes and shapes indicated.

1. Size and Shape: Rectangular, nominal brick paver dimensions.

2. Provide selections made by Architect from full range of standard colors and textures for materials and products of type indicated.

2.3 EDGE RESTRAINTS:

A. Steel Edge Restraints: Commercial steel edging with welded to face of sections at 2'-6" o.c. to receive stakes, and steel stakes 16 inches long for each loop. Size of edging as follows:

1. 3/16 inch by 4 inches high by 16 feet long.

2.4 SETTING MATERIALS FOR CONCRETE PAVERS:

A. General: Provide sound durable particles 100 percent crushed and graded as indicated.

B. Graded Aggregate for Base: Quality controlled, graded washed gravel complying with ASTM D 2940 for base material.

C. Sand for Setting Bed and Leveling Course: Fine, sharp, nonplastic aggregate complying with ASTM C 33, with 100 percent passing a 3/8" sieve and 96 percent passing a No. 4 sieve.

D. Stone Dust for Joints: Clean, washed, ground natural color granite particles complying with ASTM C 144 except use aggregate graded with 100 percent passing a No. 8 sieve and 95 percent passing a No. 16 sieve.

2.5 STONE DUST SURFACING MATERIALS:

A. Surfacing Stone Dust: Ground stone particles matching material installed in paver joints, except as indicated for grading required:

Sieve Size	Percent Passing
3/4"	100
3/8"	96
No. 4	80
No. 8	60
No. 16	40
No. 40	20
No. 100	10
No. 200	0

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine surfaces indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit pavers.

   1. Proof roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction.
   2. Do not proceed with installation of pavers and surfacing until base to receive pavers has been compacted to a minimum 95 percent density and base to receive stone dust surfacing has been compacted to 85 percent density.

3.2 INSTALLATION, GENERAL:

A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.

B. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

   1. For concrete pavers, a mortar-driven masonry saw or block splitter may be used.

C. Handtight Joints: Set unit pavers with hand-tight joints.

D. Tolerances: Do not exceed 1/32-inch unit-to-unit offset from flush (lippage) and a tolerance of 1/8 inch in 10 feet from level or slope as indicated for finished surface of paving.

E. Expansion Joints: Provide pre-molded joint filler for paving perimeter joints abutting curbs, structures, edge restraints, and other fixed objects.

   1. Extend joint fillers full width and depth of joint, flush with top of finish surface.

F. Provide edge restraint units as indicated. Install edge restraints prior to placing unit pavers.

3.3 UNGROUTED MORTARLESS CONCRETE PAVER APPLICATIONS:

A. Place graded aggregate for base over compacted subgrade. Provide compacted thickness of base indicated. Compact base to at least 100 percent of ASTM D 1557 maximum laboratory density.

1. Treat leveling base with soil sterilizer to prohibit growth of grass and weeds.

B. Place sand for leveling course and screed to a thickness of 1-1/2 inches, taking care that moisture content remains constant and the density is loose and constant until concrete pavers are set and compacted.

C. Set concrete pavers with a minimum joint width of 1/16 inch and a maximum of 3/16 inch, being careful not to disturb leveling base. If pavers have spacer bars, then place pavers hand tight against spacer bars. Use string lines to keep straight lines. Select units from 4 or more cubes to blend color and texture variations. Fill gaps between units that exceed 3/16 inch with pieces cut to fit from full-size unit pavers.

1. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.

D. Vibrate concrete pavers into leveling course with a low amplitude plate vibrator capable of a 3,500- to 5,000-pound compaction force. Perform at least 3 passes across paving with vibrator. Vibrate under the following conditions:

1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
2. Before ending each day's work, fully compact installed concrete pavers within 3 feet of the laying face. Cover the open layers with nonstaining plastic sheets overlapped 4 feet on each side of laying face to protect it from rain.

E. Spread stone dust particles and fill joints immediately after vibrating pavers into leveling course. Brush and vibrate sand until joints are completely filled, then remove surplus.

F. Do not allow traffic on installed concrete pavers until stone dust has been vibrated into joints.

G. Repeat joint filling process 30 days later.

3.4 STONE DUCT SURFACING APPLICATIONS:

A. Place graded aggregate for base over compacted subgrade. Provide compacted thickness of base indicated. Compact base to at least 85 percent of ASTM D 1557 maximum laboratory density.

1. Set edge restraints in a four foot radius around tree trunks. Do not place aggregates or other materials inside this area.

B. Place sand for leveling course and screed to a thickness of 1-1/2 inches, taking care that moisture content remains constant and roll to achieve 80 percent compaction.

C. Place stone dust surfacing materials and screed to a thickness of three inches, using spreading methods as required to ensure even distribution of fines.

D. Dampen the surface with a fine water mist and vibrate stone dust surfacing into leveling course with a low amplitude plate vibrator capable of a 3,500- to 5,000-pound compaction force. Perform at least 3 passes across surfacing with vibrator, lightly rewetting surface before each subsequent pass.

1. Protect the surface from rain until vibration operation is complete.

E. Spread additional stone dust particles and revibrate areas where unevenness is present 30 days later.

3.5 REPAIR, CLEANING, AND PROTECTION:

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

B. Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit paver work being without damage or deterioration at time of Substantial Completion.

END OF SECTION 02515

SECTION 02520 - PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY:

A. This Section includes portland cement concrete walkways, steps, slabs, and precast concrete curbing set in concrete.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Prepared subbase is specified in Section 02200, "Earthwork".
2. Concrete and related materials are specified in Section 03300, "Cast-in-Place Concrete".

1.3 SUBMITTALS:

A. Provide samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete.

1.4 JOB CONDITIONS:

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

1. Coordinate with requirements for "Temporary Facilities" specified in Section 01500.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

B. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.

C. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185.

1. Furnish in flat sheets, not rolls, unless otherwise acceptable to Architect.

D. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.

E. Fabricated Bar Mats: Welded or clip-assembled steel bar or rod mats, ASTM A 184. Use ASTM A 615, Grade 60 steel bars, unless otherwise indicated.

F. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

G. Concrete Materials: Comply with applicable requirements of Section 03300 for concrete materials, admixtures, bonding materials, curing materials, and others as required.

H. Expansion Joint Fillers: Premolded bituminous joint filler conforming to ASTM D 1751.

I. Liquid-Membrane Forming and Sealing Curing Compound: Comply with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Moisture loss no more than 0.055 gr./sq. cm. when applied at 200 sq. ft. / gal.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

   a. "Masterseal"; Master Builders.
   b. "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co.
   c. "Sure Cure"; Kaufman Products Inc.
   d. "AR -30" W.R. Meadows.
   e. "Spartan-Cote"; The Burke Co.
   f. "Sealkure"; Toch Div. - Carboline.
   g. "Kure-N-Seal"; Sonneborn-Contech.
   h. "Polyclear"; Upco Chemical/USM Corp.
   i. "Klearseal"; Setcon Industries.

2.2 CONCRETE MIX, DESIGN, AND TESTING:

A. Comply with requirements of Section 03300 for concrete mix design, sampling and testing, and quality control and as herein specified.

B. Design mix to produce normal-weight concrete consisting of portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:

1. Compressive Strength: 4000 psi, minimum at 28 days, unless otherwise indicated.
2. Slump Limits: 8 inches minimum for concrete containing high- range water-reducing admixture (superplasticizer); 3 inches for other concrete.
3. Air Content: 5 to 8 percent.
4. Water-Cement Ratio: 0.45.

2.3 PRECAST CONCRETE CURBING:

A. General: Standard 6 inch by 18 inch curb units in five foot lengths, with sectional dimensions and tolerances as indicated, fabricated straight and true:

1. Concrete Mix: Comply with requirements of Section 03300 for normal-weight, ready-mix concrete with minimum 28 day compressive strength of 4,000 psi.
2. Reinforcing: 2 - #3 reinforcing bars, top and bottom.
3. Color: Standard.

B. Accessories: Fabricate trim units as indicated to match basic components, with same profile, finish and color.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION:

A. Inspect subbase for uneven grading or improper compaction. Notify Contractor of unsatisfactory conditions. Do not begin placing work until deficient subbase areas have been corrected and are ready to receive paving.

B. Remove loose material from compacted subbase surface immediately before placing reinforcing.

3.2 CURB CONSTRUCTION:

A. General: Set curbing before beginning paving work.

B. Install curbing as indicated, or if not indicated, as follows:

1. Set curb unit in concrete slurry bed at each end, embedding unit to a minimum depth of 8 inches, or as required to provide necessary stability and support for curb unit. Set with full head bed of mortar, with uniform 3/4-inch joints.
2. Set units straight, true, level, and plumb, with joints

of uniform width and variation at joint not to exceed 1/8-inch in any direction, or 1/4-inch in 10 feet.

3.3 FORM CONSTRUCTION:

A. Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork for grade and alignment to following tolerances:

1. Top of forms not more than 1/8 inch in 10 feet.
2. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

D. Slope step treads at 1/8 inch per foot to drain.

3.4 REINFORCEMENT:

A. Locate, place and support reinforcement as specified in Section 03300, unless otherwise indicated.

3.5 CONCRETE PLACEMENT:

A. General: Comply with requirements of Section 03300 for mixing and placing concrete, and as herein specified.

1. Concrete slabs shall be 5 inches thick unless otherwise indicated.

B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

D. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

E. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

3.6 JOINTS:

A. General: Construct expansion, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete.

B. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, using one of the following methods:

1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
2. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.

C. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.

1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.
2. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.

D. Expansion Joints: Provide premolded joint filler for pavement perimeter joints abutting curbs, catch basins, manholes, inlets, structures, at top and bottom of stair courses, and other fixed objects, unless otherwise indicated.

1. Locate expansion joints at maximum 25 feet o.c. in either dimension.

E. Extend joint fillers full width and depth of joint. Place top of joint filler flush with finished concrete surface.

F. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

G. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

3.7 CONCRETE FINISHING:

A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs and formed joints with an edging tool, and round to 1/4-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:

   1. Burlap finish by dragging a seamless strip of damp burlap across concrete, perpendicular to line of traffic.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.

3.8 CURING, REPAIR AND PROTECTION:

A. Protect and cure finished concrete paving in compliance with applicable requirements of Section 03300. Use membrane-forming curing and sealing compound or approved moist-curing methods.

B. Repair or replace broken or defective concrete, as directed by Architect.

C. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION 02520

SECTION 02600 - WATER SERVICE AND FIRE SERVICE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY:

A. This Section includes the following types of water servie:

1. Domestic water service piping and appurtenances from the source of potable water to a point 5 feet outside the building.
2. Fire protection service mains and appurtenances from the source of water to a point just inside the foundation wall of the building.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 02200, "Earthwork", for excavation and backfill required for water service piping and structures.
2. Section 03300, "Cast-in-place Concrete" for supports and structures.
3. Section 15400, "Plumbing", for interior building water piping systems and equipment.
4. Section 15500, "Fire Protection", for interior building fire protection piping systems and equipment.

C. Utility Contact: The Architect has discussed work of this Section with Mr. Peter Wang, Boston Water and Sewer Commission. He may be cntacted for more detail.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for valves, pipe materials, and identification devices.

C. Coordination profile drawings showing water service piping in elevation. Draw profiles at a horizontal scale of not less than 1 inch equals 10 feet and a vertical scale of not less than 1 inch equals 5 feet. Indicate pipe, valves, structures, meter, anchors, and reaction backing. Show types, sizes, materials, and elevations of other utilities crossing water service piping.

D. Maintenance data for valves for inclusion in Operating and Maintenance Manuals specified in Division 1 Section "Project Closeout."

1.4 QUALITY ASSURANCE:

A. Comply with all requirements of the Boston Water and Sewer Commission for connections to water supply system.

B. Comply with local fire department/marshal standards and requirements of NFPA 24 pertaining to fire service materials and installation.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Preparation for Transport: Prepare valves for shipping as follows:

1. Ensure valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends, flange faces, and weld ends.
3. Set valves in best position for handling. Set gate valves closed to prevent rattling.

B. Storage: Use the following precautions for valves during storage:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect valves from weather. Store valves indoors. Maintain valve temperature higher than the ambient dew point temperature. If outdoor storage is necessary, support valves off the ground or pavement in watertight enclosures.

C. Handling: Use a sling to handle valves whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

1.6 PROJECT CONDITIONS:

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that water and fire service service piping may be installed in compliance with the original design and referenced standards.

1. Coordinate final routing and elevations to avoid existing utilities.

1.7 SEQUENCING AND SCHEDULING:

A. Coordinate connection to public water main with Boston Water and Sewer Commission.

B. Coordinate with interior water distribution piping and fire protection systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include but are not limited to the following:

1. Gate Valves, Tapping Valves, and Indicator Posts:

    a. Clow Valve Co.; Div. of McWane, Inc.
    b. Kennedy Valve; Div. of McWane, Inc.
    c. Mueller-Hersey; A Grinnell Co.
    d. U.S. Pipe & Foundry Co.

2. Underground Warning Tapes:

    a. Allen Systems, Inc.; Reef Industries, Inc.
    b. Brady (W.H.) Co.; Signmark Div.
    c. Calpico, Inc.
    d. Carlton Industries, Inc.
    e. EMED Co., Inc.
    f. Seton Name Plate Co.

2.2 PIPE AND PIPE FITTINGS, GENERAL:

A. Pipe and pipe fitting materials shall be compatible with each other.

B. Ductile-Iron Pipe: AWWA C151, Class 50, except that pipe smaller than 6-inch size shall be Class 51.

1. Lining: AWWA C104, cement mortar, sealcoated.
2. Gaskets: AWWA C111.
3. Ductile-Iron and Cast-Iron Fittings: AWWA C110, ductile-iron or cast-iron, 250-psi pressure rating; or

AWWA C153, ductile-iron compact fittings, 350-psi pressure rating.

a. Lining: AWWA C104, cement mortar.
b. Gaskets: AWWA C111, rubber.

C. Couplings: Iron body sleeve assembly fabricated to match outside diameters of pipes to be joined.

1. Sleeve: ASTM A 126, Class B, gray iron.
2. Followers: ASTM A 47, Grade 32510 or ASTM A 536 ductile iron.
3. Gaskets: Rubber.
4. Bolts and Nuts: AWWA C111.
5. Finish: Enamel paint.

2.3 VALVES:

A. Nonrising Stem Gate Valves for Water Service: AWWA C500, cast-iron double disc, bronze disc and seat rings, or AWWA C509, resilient seated; bronze stem, cast-iron or ductile-iron body and bonnet, stem nut, 200-psi working pressure, mechanical joint ends.

B. Nonrising Stem Gate Valves for Fire Water Service: UL 262/FM approved, iron body and bonnet with flange for indicator post, bronze seating material, inside screw, 175-psi working pressure, mechanical joint ends.

1. Indicator Posts: UL 789/FM approved, vertical type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.

C. Valve Boxes: Cast-iron box having top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.

1. Provide a steel tee-handle operating wrench with each valve box. Wrench shall have tee handle with one pointed end, stem of length to operate valve, and socket fitting valve operating nut.

D. Tapping Sleeve and Tapping Valve: Provide a complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. The sleeve and the valve shall be compatible with the tapping machine to be used.

1. Tapping Sleeve: Cast-iron or ductile-iron 2-piece bolted sleeve with flanged outlet for new branch connection. Sleeve may have mechanical joint ends with

rubber gaskets or have sealing rings in the sleeve body. Sleeve shall mate with the size and type pipe material being tapped. Outlet flange shall be size required for branch connection.

2. Tapping Valve: Gate valve equivalent to AWWA C500, bronze mounted, or AWWA C509, resilient seated; nonrising bronze stem, cast-iron or ductile iron body and bonnet, stem nut, 200-psi working pressure, one flanged end and one mechanical joint end.

2.4 ANCHORAGES AND ACCESSORIES:

A. Clamps, Straps, and Washers: ASTM A 506, steel.

B. Rods: ASTM A 575, steel.

C. Rod Couplings: ASTM A 197, malleable iron.

D. Bolts: ASTM A 307, steel.

E. Cast-Iron Washers: ASTM A 126, gray iron.

F. Concrete for Encasement work, Bearing, and Reaction Thrust Blocks: Portland cement concrete mix, 3,000 psi.

1. Cement: ASTM C 150, Type I.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.
5. Reinforcement: Steel conforming to the following:
    a. Fabric: ASTM A 185, welded wire fabric, plain.
    b. Bars: ASTM A 615, Grade 60, deformed.

2.5 IDENTIFICATION:

A. Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches wide by 4 mils thick, solid blue in color with continuously printed caption in black letters "CAUTION - WATER LINE BURIED BELOW."

PART 3 - EXECUTION

3.1 PREPARATION OF BURIED PIPE FOUNDATION:

A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation throughout the length of the piping.

B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid and backfill with clean sand or pea gravel to indicated level.

C. Shape bottom of trench to fit bottom of piping. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.2 INSTALLATION OF PIPE AND PIPE FITTINGS:

A. Ductile-Iron Pipe: Install with cement-mortar-lined, ductile-iron or cast-iron, mechanical joint or push-on joint fittings and rubber gaskets in accordance with AWWA C600.

B. Encase water service piping in minimum 12" reinforced concrete a distance of ten feet to either side where water service crosses over or under a sanitary sewer line.

C. Depth of Cover: Provide minimum cover over piping of 60 inches below finished grade. Route pipes as required to maintain minimum cover.

D. Water Main Connection: Tap water main with size and in location as indicated, in accordance with requirements of the Boston Water and Sewer Commission.

1. Install tapping sleeve and tapping valve in accordance with manufacturer's installation instructions.
2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
3. Install gate valve onto tapping sleeve. Comply with AWWA C600. Install valve with stem pointing up and with cast-iron valve box.
4. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water or fire service piping.

E. Water Service Termination: Terminate water service piping 5'-0" from building foundation in location and invert as indicated. Provide temporary pipe plug for piping extension into building.

F. Fire Service Termination: Terminate fire water service piping inside building foundation wall where indicated. Provide 3/4-inch valved test tee and pressure gage. Provide sleeve cast into building wall and watertight sleeve seal.

3.3 INSTALLATION OF VALVES:

A. Water Service: Use mechanical joint end valves for buried installation.

B. Fire Water Service: Use mechanical joint end, nonrising stem gate valves for buried installation. Use nonrising stem UL/FM gate valves for installation with indicator post.

C. AWWA-Type Gate Valves: Comply with AWWA C600. Install buried valves with stem pointing up and with cast-iron valve box.

D. UL/FM-Type Gate Valves: Comply with NFPA 24.

1. Install buried valves and valves in pit with stem pointing up and with vertical cast iron indicator post.
2. Locking and Sealing: Secure unsupervised valve by installing padlock on wrench on indicator post.

3.4 INSTALLATION OF ANCHORAGES:

A. Anchorages: Provide anchorages for tees, plugs and caps, bends, crosses, and valves.

B. Construct thrust blocks of poured-in-place concrete of dimensions indicated.

3.5 APPLICATION OF PROTECTIVE COATINGS:

A. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.6 INSTALLATION OF IDENTIFICATION:

A. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 to 8 inches below finished grade, directly over piping.

3.7 FIELD QUALITY CONTROL:

A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have sufficiently hardened. Fill pipeline 24 hours prior to testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.

1. Increase pressure in 50-psi increments and inspect each joint between increments. Hold at test pressure for one hour; decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour. Maximum allowable

leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.

3.8 CLEANING:

A. Clean and disinfect water distribution piping as follows:

1. Purge all new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired, prior to use.
2. Use the purging and disinfecting procedure prescribed by the Boston Water and Sewer Commission.
3. Comply with NFPA 24 for flushing of fire service piping. Flush the piping system with clean, potable water until dirty water does not appear at the points of outlet.

B. Prepare reports for all purging and disinfecting activities.

3.9 VALVE SCHEDULE:

A. Nonrising Stem Gate Valves:

	AWWA - MECH JT	
MANUFACTURER	C500	C509
American Darling	55	85
Clow Valve	F-5065	F-6100
Kennedy Valve	571X	1571X
Mueller-Hersey	A-2380-20	A-2370-20
Stockham Valve	G-743-O	G-701-O
U.S. Pipe	3460	5460
Waterous	300 Series	500 Series

B. Tapping Valves:

MANUFACTURER	
American Darling	565 or 865
Clow Valve	F-5093
Kennedy Valve	950X
Mueller-Hersey	H-667
U.S. Pipe	3860

C. Fire Service Gate Valves:

MANUFACTURER	UL 262/FM MECH JT
American Darling	55 U
Clow Valve	F-5725

Kennedy Valve	71X
Mueller-Hersey	A-2052-20
Stockham Valve	G-635
U.S. Pipe	5460 UL/FM
Waterous	500 Series UL/FM

END OF SECTION 02600

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